

**Dissertationes Forestales 269**

**Renewing the sawmill industry: studies on innovation,  
customer value and digitalization**

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Academic Dissertation

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## **ABSTRACT**

The sawmill industry's current business strategies are based on traditional, production-oriented business logic. However, the ruling sources of competitiveness (lower prices and higher production volumes) are no longer sufficient to maintain the industry's profitability. A shift from manufacturing to service economy includes vast potential to improve customer value and, hence, business performance. The service view suggests that instead of being created by production, customer value derives from processes in which the provider supports the customer's value creation. This view positions the customer at the core of the business and challenges prevailing business approaches within traditional industries.

The goal of this thesis is to explore the sawmill industry's business transformation toward customer orientation and service-based business. As firms do not operate in isolation from their surrounding business environment, the entire wood products industry is considered. Service logic was used as the research frame to accentuate the value-based business approach. The novelty of this thesis is applying customer orientation to improve the forest industry's innovation and competitiveness. Digitalization is a core of innovation and offers potential to take customer orientation to a new level. Therefore, two closely connected concepts with customer orientation, innovation and digitalization, were also studied. Both interviews and case studies were used, comprising a total of 36 semi-structured interviews.

This thesis suggests that by positioning customers at the core of the business and by applying service-based business practices, the sawmill industry is in better position to achieve long-term competitiveness. This idea, however, necessitates significant strategic changes, questioning existing practices and principles of the entire wood products industry. The first step in the change toward a customer-oriented business (i.e., service-based business) is to gain more understanding of customer orientation and embrace this approach as an organization-wide attitude, not only within the sawmill industry, but throughout wood value chains.

**Keywords:** Business transformation, customer value creation, service logic, competitive advantage, digitalization, wood products industry

*“The difficulty lies not so much in developing new ideas as in escaping from old ones”*

John Maynard Keynes

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At the beginning of my doctoral thesis, I thought about this moment many times. Several years of work is behind me and I only have one last thing to write: the acknowledgements section. Finally, I know how it feels accomplishing a long-time goal. I am filled with joy, relief and great gratitude.

The world around us is intriguing, full of opportunities in every aspect, and my curiosity and a need to understand its diversity led to this dissertation. At the core of the topic is knowledge and relationship value. Without cross-border business collaboration, the knowledge-base of firms is narrower. Without knowledge, it is harder to improve an offering and innovate. Both are the aspects that will increase in importance in the future, particularly because fast developing technology creates better ways to deliver value to customers. I chose to examine the value creation within the wood products industry, as I have worked almost all my professional career within the forest industry and the wood products industry provided an interesting starting point for exploring a business transformation from manufacturing to service-based business. Since many businesses seem to struggle with similar issues regardless of the industry, I look forward to applying this knowledge to my current work in the financial sector.

My work has required high motivation, persistence and a little luck. One of the most substantial occurrences during my journey was meeting my thesis adviser, Professor Marja Toivonen, whose expertise, patience and good humor have helped me to cope throughout the process. I want to express my deepest gratitude for your ample and valuable guidance, commitment and friendship. I would also like to express my sincere thanks to the thesis supervisor Professor Lauri Valsta, who helped me in many ways during the stages of my professional career: starting from base studies, entering into working life and most recently providing valuable support and advice with this thesis.

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Marika Makkonen  
Espoo, January 2019

## LIST OF THE ORIGINAL ARTICLES

This thesis consists of the following three articles, referred to by their Roman numerals, and the summary. Articles I, II and III are reprinted with permission from the publishers.

- I Makkonen, M., Aminoff, A., Valkokari, K. (2017) Stimulating supplier innovation in a complex and regulated business environment – a dyadic case study. *International Journal of Innovation Management* 22(3), 1850027. <https://doi.org/10.1142/S1363919618500275>
- II Makkonen M, Sundqvist-Andberg H. (2017). Customer value creation in B2B relationships: Sawn timber value chain perspective. *Journal of Forest Economics* 29: 94–106. <https://doi.org/10.1016/j.jfe.2017.08.007>
- III Makkonen, M. (2018) Stakeholder perspectives on the business potential of digitalization in the wood products industry. *BioProducts Business* 3(6): 63-80.

## DIVISION OF LABOUR IN CO-AUTHORED ARTICLES

	I	II	III
Conception & design	AA, MM, KV	MM, HSA	MM
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Data collection	MM, AA	MM, HSA	MM, HSA
Analysis & interpretation	MM, AA, KV	MM, HSA	MM
Writing the article	MM, AA, KV	MM, HSA	MM
Overall responsibility	MM	MM	MM

MM = Marika Makkonen, HSA = Henna Sundqvist-Andberg, AA = Anna Aminoff, KV = Katri Valkokari

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# 1. INTRODUCTION

## 1.1. Transforming business strategies in the wood products industry

The focus of this thesis is on the sawmill industry's business strategies and long-term competitiveness. However, as "*no business is an island*" (Håkansson & Snehota, 1989, p. 189), the sawmill industry's competitiveness cannot be analyzed in isolation from its surrounding environment. Hence, the strategies of the entire wood products industry (i.e., the sawmill, plywood, chipboard, fiberboard, building wood, carpentry and woodworking industries) are considered. In this thesis, sawmills refer to the firms in which the primary objective is sawn timber production, not producing chips for the needs of the pulp mills (e.g. Kallio, 2001).

Sawmills have a central role in the forest industry. By paying two-thirds of forest owners' stumpage earnings, the sawmill industry has a major impact on motivating forest owners to manage their forests, sell wood and supply wood raw material for the entire forest industry (i.e., wood products industry and pulp and paper industries). Approximately 90% of all wood raw material used by the wood products industry is channeled through sawmills. Therefore, the sawmills are like "a hub" that procures wood and distributes sawn timber to other actors in the sawn timber value chains (also referred to as wood value chains in this thesis). The wood value chains consist of actors that transform trees into solid wood products. As typical in manufacturing, these chains are long and complex (Niemelä & Smith, 1996), characterized by several business-to-business (B2B) relationships. The associated risk is that firms operate in silos, without considering the influence of their actions on others in the value chain or on their overall profitability (Katunzi, 2011).

The greatest cost item for the sawmill industry is wood raw material, often accounting for more than 70% of all operating costs (Hansen et al., 2013). Approximately four-fifths of sawn timber ends as direct or as further processed products for construction. This exposes the industry to cyclical fluctuations in demand and product prices. In effect, highly volatile wood raw material and sawn timber prices are the most significant factors determining the industry's business success (Toppinen et al. 2013). According to FAOSTAT (2018), on average, 68% of sawn timber production was exported by the three largest countries exporting sawn timber globally (Canada, Russian Federation and Sweden) in 2012 through 2016. In Finland, the corresponding figure was 71%. Therefore, as the industry is dependent on sawn timber exports, changes in the global markets (e.g., demand, supply, exchange rates, cost levels of competing countries) reflect both wood raw material and sawn timber prices. In the 21<sup>st</sup> century, the profitability of the Finnish wood products industry has declined rather steadily. In addition to the exchange rates and increased raw material prices, the profitability problems within the sawmill industry have resulted from wood raw material availability, global oversupply of sawn timber and economic uncertainty.

The global financial crisis relentlessly demonstrated the sawmill industry's vulnerability to economic fluctuations. The European sawn timber markets plunged in 2008, remaining stagnated for several years (Hurmekoski et al., 2015). Deteriorated competitiveness was witnessed also in the Finnish sawmill industry in the 2010s (Mattila et al., 2016). Despite the nascent recovery of the global economy from 2016 onwards, the increased sawn timber demand has not counterbalanced rising costs, keeping the industry's profitability low. However, some firms have been competitive with a product-driven business strategy. For example, Hansen et al. (2015) discovered that firms focusing on a differentiation strategy

perform financially better than those executing a cost leadership strategy. This finding was explained by increasing demand for new bio-based products and firms' agility developing new dynamic capabilities, which may help discover insights into maintaining low costs.

The sawmill industry's challenges largely lie in its business strategies. The industry is often described as mature and commodity-focused (e.g., Brege et al., 2010; Stendahl et al., 2013; Toppinen et al., 2013), with low levels of customer understanding and innovation (Han & Hansen, 2017; Hansen et al., 2017). The generally maintained assumption is that a production-oriented business logic predominates the sawmill industry. Characteristic of this logic include firms seeking profitability through production efficiency (e.g., large production volumes, cost reductions and the optimal usage of raw materials) (Lähtinen & Toppinen, 2008) and marketing often being merely a responsibility of firms' sales departments (Hansen & Juslin, 2011). In addition to operational efficiency, a well-functioning wood raw material markets has been considered a prerequisite for the sawmill industry's competitiveness. This means continuous and steady raw material flows from forests at a competitive price.

As the society in general, the sawmill industry's business environment is becoming increasingly complex. Globalization, fierce competition, technological advancements, climate change, increasing competition for raw materials and fluctuating and diversified customer demands (Näyhä et al., 2015; Han & Hansen, 2016) affect the role of the industry's traditional sources of competitiveness. These changes have often been considered a threat to the industry, but the impacts can also be positive. For example, globalization increases not only competition but also markets for wood products. While climate change may increase pressures to decrease annual cutting of trees, it can increase demand for wood as a building material. The changes, however, mean that the static efficiency, usage of physical production factors and economies of scale may not result in optimal financial outcomes in all situations (Toppinen et al., 2013). To find new paths for competitiveness, the sawmill industry needs new and creative combinations of all its resources, not only effective utilization of raw material (Lähtinen et al., 2009).

Recent developments within the field of marketing theory highlight that instead of having a focus on goods or services, marketing should stress service and the customers role in business (Saarijärvi et al. 2017). This differs from traditional, production-oriented views, where value is perceived as embedded in goods, and customers "destroy" this value. Improved customer focus has also been increasingly linked to the forest industry's future competitiveness (Niemelä et al., 1996; Uusitalo, 2005; Toppinen et al., 2011; Hansen et al., 2015; Mattila, 2015; Mattila et al., 2016) and innovation (Nybakk et al., 2011; Hansen et al., 2017). Also, innovative utilization of the information and communication technologies (ICT) has been noted (Cohen & Kozak, 2001; Hetemäki, 2010). A common factor for customer focus, innovation and ICT is their potential to provide superior customer value, which is the source of a firm's long-term success (Woodruff, 1997). Firms' abilities to create superior customer value is closely linked with customer orientation (Narver & Slater, 1990). Customer-oriented firms can outperform their rivals by learning from customers' needs (Payne et al., 2008), sensing fundamental changes in the business environment (Khanagha et al., 2017) and providing improved offerings or innovations that fulfill the customers' needs (Brady & Cronin, 2001).

Research on service marketing places customers at the core of the business (e.g., Grönroos, 1995; Vargo & Lusch, 2008a, 2008b; Grönroos, 2011a; Gummesson & Mele, 2010; Heinonen et al., 2010; Kowalkowski et al., 2013; Heinonen & Strandvik, 2015). "Service" is a strategic choice, focusing on how firms can support customers' value creation through integrating with customers (Saarijärvi et al., 2014). The service perspective is viewed

as “revolutionary” by containing the potential to transform marketing with an organization-wide, customer-oriented attitude, hence improving a firm’s relevance to its customers (Grönroos & Gummerus, 2014). This contrasts with production-oriented views that regard marketing as a separate function (*ibid.*).

Novel technological solutions are increasingly changing the dynamics of customer orientation and customer value creation. Digitalization enables an improved interaction within a firm and between its stakeholders (Matt et al., 2015; Parida et al., 2015). From the firm’s perspective, digitalization can facilitate the creation of customer understanding and the emergence of better offerings or innovations (Lerch & Gotsch 2015). From the customers’ perspective, digitalization can improve customers’ value perception in numerous ways: in addition to better products and services targeted at customer needs, transparency can be added as the customers have much more information available to evaluate the offering’s potential benefits and costs. This is important, because customers increasingly interact with firms through electronic channels. Imaginative application of digitalization can provide opportunities to transform or reshape existing business, offering completely new ways to stand out from rivals (Porter and Heppelmann 2014; Henriette et al. 2015). Although digital technologies are assumed to play an active role in developing the service-based business and value co-creation in manufacturing industries, little is known about the ways in which digital technologies can disrupt a firm’s business strategies (Ardolino et al., 2018)

Despite the suggested advantages of customer orientation and emerging technologies supporting customer-oriented business, only limited empirical evidence suggests their potential in the forest industry. In particular, research focusing the ways firms can support customers’ value creation through integrating with customers (i.e., service) is limited. Contemporary literature seems to focus more on operational effectiveness (Hansen et al., 2006), while research on organizational aspects, such as business strategy or business model transformation, is scarce. Those studies focusing on strategic issues have only recently emphasized customer-focus and a firm’s resources in strategy implementation (see Hansen et al., 2006, 2017; Mattila & Roos, 2014; Näyhä et al., 2015; Mattila et al., 2016; Han & Hansen, 2017). Research focusing on the technological development in the forest sector is largely neglected as technology “*is often taken as given*” (Hetemäki, 2010). In particular, the possibilities of technology to improve the sector’s competitiveness have been ignored. Consequently, only limited guidance exists for industry managers about the potential of customer orientation (Hansen et al., 2006), interaction and value creation with customers (Toppinen et al., 2013). Further, little research has been conducted on the relationship between innovation and competitiveness (Hansen, 2010). This makes the development of customer-centric business within the wood products industry challenging.

## 1.2. The purpose of this thesis

According to Näyhä, Pelli and Hetemäki, (2015, p. 385), “*it is not enough only to recognize the need for renewal but also to develop the necessary capacities and new thinking to make it possible.*” Therefore, to address the above-described challenges faced by the sawmill industry, the aim of this thesis is to explore the industry’s business transformation toward customer orientation in B2B context. As service-based businesses are increasingly viewed as offering better premises for customer value creation compared to traditional, production-oriented business logic, a service logic (SL) (Grönroos, 2008, 2006; Grönroos & Gummerus, 2014) is introduced to examine the transformation. More precisely, the study attempts to

increase understanding of the potential of customer orientation, innovation and digitalization and determine how these approaches could help industry managers develop service-based businesses. The potential benefits are explored through literature on customer orientation, open innovation, service logic and digitalization. Although roundwood markets and political decisions (e.g., subsidy for forest chips) also affect the sawmill industry's competitiveness, these topics are not addressed in this thesis. Based on the identified gaps in earlier studies, the research focuses on the following questions:

- 1) What are the potential benefits of customer-orientation, open innovation and digitalization in improving the sawmill industry's customer value creation and the industry's long-term competitiveness?
- 2) What are the business development needs required to improve customer orientation within the industry?

The research has been implemented in three complimentary studies that address the main questions from different viewpoints. These individual studies have been reported in Articles I through III. Table 1 summarizes the aim of this thesis and the research questions. To clarify the specific contributions of the individual articles to this thesis, the core interests of the articles are also presented in Table 1.

**Table 1.** Aim of the thesis and the research questions and core interests of the articles

<b>Aim of the research</b>	To explore the potential benefits of customer orientation, innovation and digitalization in the wood products industry's renewal	
	<b>Research questions</b>	<b>Core interest</b>
Article I	How can one increase the supplier's willingness to share its ideas and contribute to the buyer's innovation process?	Exploring ways to gain access to distributed knowledge across the firm's boundaries and to foster value creation through open innovation.
Article II	<p>What are the needs of sawmills' B2B customers as defined by customers themselves, and how do these needs differ from the way in which sawmills see them?</p> <p>How could the business of sawmills be developed based on the needs of direct customers (further processors) and indirect customers (industrial end-customers)?</p>	Exploring how sawmills' B2B customers perceive sawmills' current customer orientation and aims to uncover the drivers of the customers' value creation.
Article III	How could the better utilization of digitalization improve customer-orientation and competitive advantage of firms within the wood value chains as defined by the industry stakeholders themselves, and how should business be developed?	Exploring the potential of digitalization to create value within the wood products industry and to reshape the wood products industry's business models toward customer-orientation.

The way the research questions are linked and create the basis for the subsequent article is described in Section 3.1.

## 2. LITERATURE REVIEW

This chapter introduces the theoretical background of this thesis. The chapter begins with a review of the business strategies in the forest industry to better understand the current state of the sawmill business and its success factors. In addition, the chapter addresses how the main concepts of the study (open innovation, customer orientation and digitalization) are connected and relevant to the wood products industry. The chapter proceeds by introducing dominant approaches to value creation and to the competitive advantage of a firm. To achieve long-term competitiveness, firms need to provide superior customer value (Woodruff, 1997). Customer orientation, which is a strategic approach to value creation and viewed as a source of superior customer value, is discussed next, followed by different perspectives on customer value creation. In particular, the difference between value delivered by an offering (i.e. the traditional, manufacturing view) and value creation in relationships (i.e., the customer-oriented view) is presented to understand how customers can extract value from the usage of resources. Thereafter, the discussion about relationship value expands by introducing “service” as a central concept and by examining its linkage to business logic that focus on customer value. Specifically, the “service logic” (SL), which is applied as the main conceptual approach in this thesis, is discussed in more detail. Innovation interlinks customer focus and firm success (Han et al., 1998; Agarwal et al., 2003; Kirca et al., 2005) because learning from customers and other stakeholders can foster development of solutions and innovations that offer greater customer satisfaction (Adams et al., 1998; Brady et al. 2001). The final chapter demonstrates why innovation, particularly the concept of open innovation, and value creation are important in today’s business environment. Further, it explains how open innovation can contribute to service-based business, as well as why digitalization is a core of innovation.

### 2.1. Evolution of business strategies in the forest industry

The main strategic orientations in the global forest sector are forestry orientation, production orientation and market orientation (Cohen & Kozak, 2001; Hansen & Juslin, 2005; Toppinen et al., 2013). Until the 1950s, the high demand for forest products ensured the profitability of firms, and the main focus of businesses executing forestry orientation was to ensure efficient extraction of trees from forests (Cohen et al., 2001). Technological developments in the 1960s and 1970s enabled maximization of production efficiency and minimization of production costs, shifting the focus from forestry orientation to product orientation (Cohen et al., 2001; Anne Toppinen et al., 2013). Within this business logic, firms’ marketing is regarded as equal to sales (Hansen et al., 2005). Further, the business is dominated by mass production, while the customers and the product end-users are set aside (*ibid.*). As the focus is in cost reductions and process efficiency, this strategy often results in investments in high-tech production technologies (Hansen et al., 2013). In product-oriented strategies, competitive advantage is based on tangible assets (e.g., products’ functionality and utility),

which is an effective strategy in conditions of high demand, simple customer needs and limited competition (Hansen et al., 2011). This is not the case in the wood products industry, where demand fluctuates, customer needs are increasingly complex and the environment is fiercely competitive.

In strategy development and implementation, value is a key consideration (Ulaga, 2001). By the end of the 20th century, changes in the business environment (e.g., globalization, economic downturns, changing customer needs) shifted the forest industry's focus toward the customer-provider relationship and market orientation (Cohen et al., 2001; Hansen et al., 2005). This shift reflected the development of modern marketing theories that contend that customers, not a firm, create value (Zeithaml, 1998). Market orientation, also referred to as customer orientation, closely links to firms' competencies to interact with customers, as well as the firms' learning and innovation capabilities (Han et al., 1998). Several studies, however, support the view that the forest industry is still strongly product-oriented (e.g., Stendahl & Roos, 2008; Husso & Nybakk, 2010; Hansen et al., 2011; Toppinen et al., 2013). In practice, the industry's means to improve customer orientation meant increased interaction with customers to provide value-added products and services (Toivonen et al., 2005; Hansen et al., 2006; Toppinen et al., 2013) and customer segmentation (Cohen & Kozak, 2001). Instead of representing customer orientation, these measures reflect differentiation strategy characteristic for goods-centered businesses (i.e., product orientation). Thus, instead of being a core of a business, the customers were treated as targets for an offering. More support for this view is provided by the recent literature review, which revealed the wood products industry's strategic research has been recently focused on "*technology solutions as means to serve customer better, not on providing new services and new business models and strategies related to them*" (Näyhä et al., 2015, p. 384).

A strong emphasis exists towards customer-oriented business approaches, which call for progressively-minded entrepreneurs with customer-oriented management skills (Spetic et al., 2016). Several forestry researchers have voiced that customer-oriented business approaches should be applied to examine the forest industry's strategic issues (e.g., Hurmekoski & Hetemäki, 2013; Stendahl et al., 2013; Mattila & Roos, 2014; Näyhä et al., 2015; Mattila et al., 2016). Identified development needs relate to the firms' ability to develop new types of products, services and customer interfaces (Hansen & Juslin, 2005), as well as on their ability to utilize intangible resources (i.e., knowledge) in business (Cohen & Kozak, 2001). Research has also suggested that the wood products industry should be "*like any other high-end, highly technological, and knowledge-based business*" where managers are able to tailor their manufacturing competencies according to their target markets (Spetic et al., 2016, p. 25). The strong emphasis on knowledge utilization (i.e., transforming scattered information into value-added activity) or service (i.e., using firm resources for the benefit of a customer) has resulted in views where knowledge orientation (Cohen et al., 2001) or service orientation (Toppinen et al., 2013; Wan, 2014) are suggested as the next possible paradigms of the forest industry. The term "service" suggests that firms alone do not create value, but instead value derives from collaboration with customers, suppliers, employees and other stakeholders. Thereby, service means broader and more supportive roles in the customers' value creation process (Grönroos, 2008). Contemporary business research in the forest industry context seems to fail to provide sufficient guidance in these needs. More knowledge about how to develop firms' strategies and improve competitiveness through customer orientation and innovation is needed (Knowles et al., 2008).

To maximize the overall benefit of a customer-oriented business approaches, customer-centered thinking should pass through the value chain instead of just being applied by an

individual firm. This means coordinated and efficient inter-firm and intra-firm communication (Han & Hansen, 2017) that ensures effective processes, accurate and timely understanding of customers' needs, and better opportunities to meet these needs. For instance, an information transfer from previous or subsequent processes can have a crucial effect on process efficiency in wood value chains (Uusitalo, 2005). The chain complexity, however, may challenge the information transformation about customers' needs back to the upstream value chain (Peltoniemi, 2013). Rapid development of ICTs have brought customer interfaces, learning from customers and innovation to a new level, disrupting prevailing business models. For example, digitalization is viewed as a way to address complex customer interactions (Lerch & Gotsch, 2015; Matt et al., 2015), providing an effective tool to overcome the chain complexity. By allowing access to a broad range of information sources, new opportunities for service-based business and innovation emerge (Lusch & Vargo, 2014). Some researchers have even claimed that digitalization is the core of the next industrial revolution (e.g., Brynjolfsson & McAfee, 2012).

Several factors should be considered when transforming the wood products industry. Environmental and social sustainability are increasingly emphasized by consumers (e.g. Vidal & Kozak 2008; Panwar & Hansen 2009, Toivonen, 2011, Toppinen et al., 2013; Pätäri et al. 2015). This profoundly characterizes customer relationships, services and business development within the wood products industry. Operational requirements, such as wood raw material availability (Lähtinen, 2007; Hansen et al. 2013), requirements for more optimal use of raw materials (e.g., Kivinen, 2004; Nordmark, 2005; Song & Usenius, 2007; Lähtinen & Toppinen, 2008; Rummukainen, 2017), and logistics and lead times (e.g., Carlsson & Rönnqvist, 1999; Arce et al. 2002; Uusitalo, 2005), also generate dependencies, limitations and demands within the wood value chains. Investment costs can also be significant. Although there are always factors that are beyond the control of an individual firm, many challenges and bottlenecks can be turned into opportunities to create customer value (e.g. through digitalization) and to differentiate from competitors.

## **2.2. Theories on the competitive advantage of a firm**

A firm's competitive advantage has been regarded as a central theme in the field of strategic management (Porter, 1996; Hoskisson et al., 1999; Furrer et al., 2008). Although having multiple, and often noncompatible, definitions (Srivastava et al., 2001), competitive advantage is commonly conceptualized as an ability to generate higher value for a firm's stakeholders compared to the value that its current or potential competitors offer (Barney, 1991). This ability is a result of a firm's internal factors (strategy and organizational structure) and external factors (business environment) (Caves, 1980). Competitive advantage is demonstrated in several ways. For example, customers may be willing to buy products or services at a profit despite the competitor being superior in size, strength, product quality or distribution power (Coyne, 1986).

Two dominant frameworks have been used to explain a firm's competitive advantage: the market-based view (MBV) and the resource-based view (RBV) (Porter, 1980, 1985; Conner, 1991). Instead of competing frames, these views are complementary, "*providing the greatest utility when employed together*" (Peteraf & Bergen, 2003). Understanding these frameworks is important to comprehend the prevailing business logic in the wood products industry and these methods' suitability to meet the needs of today's business environment.

According to MBV, a firm's competitive advantage depends on its position within an industry and its ability to differentiate itself from its peers. By using the Five Forces Model (customers, suppliers, new entrants, substitute products and competitors), a firm can assess an industry's attractiveness relative to its structure (Porter, 1980, 1985). The firm can also determine which of the three generic competitive strategies (low cost leadership, differentiation or focus) can generate higher value than its competitors (*ibid.*). The creation of superior customer value requires different resources and strengths, managerial style and organizational arrangements in each of these generic strategies (Toppinen et al., 2013). For example, firms focusing on a cost leadership strategy usually aim to offer a lower price to sustain a low-cost position compared to competitors (Porter, 1980). In turn, firms pursuing a differentiation strategy need to focus on product properties, brand image, customer service and marketing channel control (*ibid.*). Furthermore, MBV contends that firms able to provide customer value more efficiently (lower cost), or to offer products for which consumers are willing to pay a premium price (differentiation), survive in the competition between firms (Reed et al., 2000). Consequently, a firm following these strategies can beat its rivals by either being cheaper or different.

At the turn of the 1980s and 1990s, academics in strategic management advanced the traditional (market-based) view by stating that instead of products and market positioning, the competition should be based on resources and capabilities (Wernerfelt, 1984; Barney, 1986; Prahalad et al., 1990). With roots in the work of Penrose (1995), the resource-based view (RBV) considers a firm as a bundle of unique capabilities and (heterogenous) resources, which can be converted into final products or services (Amit & Schoemaker, 1993). According to RBV, firms can excel in competition if they possess either tangible resources (physical things) or intangible resources (capabilities) that have strategic relevance (Barney, 1991). This implies that over all a firm's resources, competitive advantage can only result from those resources that are valuable, rare, imperfectly imitable and non-substitutable (VRIN) (Barney, 1991). Barney (1991) cites prior definitions for firm resources: "*all assets, capabilities, competencies, organizational processes, firm attributes, information, knowledge, and so forth that are controlled by a firm and that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness* (Daft, 1983)." As this new approach was able to explain differences between firms instead of industries (Rumelt, 1991), RBV was considered one of the substantial theories in the field of strategic management and business strategy (Mele & Della Corte, 2013). While strategy defines the firm's objectives, plans and actions to maximize profit (Hansen et al., 2006), the organizational structure refers to a firm's operative capabilities and resources to implement the strategy. The operative capabilities determines how the tasks are internally allocated and coordinated and how decisions are made within the firm (Caves, 1980).

According to Coyne (1986), competitive advantage is meaningful when the following conditions are met: (1) there is a consistent difference in the key buying criteria between a producer's and competitors' offerings, (2) the difference results from a capability gap between the producer and its competitors, and (3) the two previous conditions are expected to continue over time. This suggests that a long-term competitive advantage necessitates knowledge about customers' needs and an ability to offer products and services that satisfy those needs. Also, there must be barriers to imitation (Reed & DeFilippi, 1990). These are the premises of sustainable competitive advantage (SCA) (Coyne, 1986).

Barney (1991, p. 99) argues that "*firms obtain sustained competitive advantage by implementing strategies that exploit their internal strengths, through responding to environmental opportunities, while neutralizing external threats and avoiding internal*



*weaknesses.*” While rare and valuable resources result in temporary competitiveness, SCA derives from resources that are difficult or costly to imitate. Such resources are often intangible in nature, referring to organizational knowledge and skills. More precisely, tacit knowledge (Reed et al., 1990) and social complexity (e.g., reputation, managerial relationships, relationships with clients and suppliers, and organizational culture) may give a firm an advantage over its peers (Mele & Della Corte, 2013). However, Coyne (1986) states that possessing SCA does not guarantee financial success, and a firm can also succeed without it if markets are growing rapidly. Tacit knowledge is opposite to explicit knowledge, and several authors argue that tacit knowledge largely defines a firm’s competitive advantage (Nonaka & Takeuchi, 1995; Teece et al., 1997; Johannessen et al., 2001; Cavusgil et al., 2003). This knowledge is realized through an individual’s skills, techniques, knowledge and routines (Lam, 2000). Since tacit knowledge is not easily coded, transferred or interpreted, it is difficult for competitors to imitate (Teece, 1998).

Over time, the theories and approaches to strategic management have developed through RBV (Hoskisson et al., 1999). For example, the dynamic capabilities view (DCV) is grounded in an idea that resources are actually the source of capabilities, which leads to competitive advantage (Grant, 1991). The DCV highlights the adaptive nature of firm resources and capabilities to the surrounding business environment through responsiveness and agility (Agarwal et al., 2007). However, this view fails to explain how dynamic capabilities can support provision of integrated products and services and how a firm can take a part in customers’ value creation processes (Rasouli et al., 2015). The spin-off of RBV, relational view, states that instead of being owned by a single firm, significant resources extend beyond one firm’s boundaries, and inter-firm linkages result in supernormal profit (relational rent) and competitive advantage (Dyer & Singh, 1998). The knowledge-based view (KBV), in turn, extends RBV by centering on human capital and assumes a firm should focus on the creation and transfer of knowledge in the increasingly global, turbulent and complex knowledge-based economy (Kogut & Zander, 1996; Johannessen et al., 2001). The knowledge-based economy, or knowledge economy, is driven by rapid development of information and communication technologies, and it is viewed as the most important resource for firm growth (ICT) (Johannessen et al., 2001). Although knowledge is important in other economic systems (e.g., industrial economy), the knowledge economy puts more emphasis on intellectual capabilities, which it considers primary, over physical assets or natural resources (Powell & Snellman, 2004).

A need to provide highly customized integrated solutions through collaboration and value networks has expanded the ideas of RBV in the service marketing stream (Rasouli et al. 2015). According to Mele & Della Corte (2013), instead of having intrinsic value, resources become valuable when they are applied and integrated. The focus of strategic management has increasingly shifted from tangible to intangible resources (i.e., knowledge), and the role of customers as resource integrators and value creators has been highlighted (e.g., Vargo & Lusch, 2008b). Simultaneously, the role of digital technologies, along with digital capabilities in the service context, has become increasingly central (Rasouli et al. 2015; Ardolino et al. 2018). The customer-centric approach is discussed in more detail in the following two sections, which introduce the concepts of customer orientation and service-based business as perspectives on value creation.

### 2.3. Views on customer orientation

Customer orientation is a strategic approach to a firm's competitive advantage. As a successful business approach (Woodruff, 1997; Teece, 2010), customer orientation enables a firm to have a better position to gain long-term competitiveness (Woodruff, 1997) through offering improved quality compared to peers (Saura et al., 2005). Putting customers and customer value at the core of a firm's activities is not new. A pioneering contribution accentuating customer orientation was published by Drucker (1954). Levitt (1960) amplified and expanded Drucker's ideas by noting that firms are too focused on their production processes instead of on satisfying customer needs. To keep business growing, firms should adopt a customer-oriented marketing strategy as an organization-wide approach instead of thinking about the strategy as a responsibility of the marketing department.

Levitt's ideas have been criticized regarding the coverage of customer orientation. Several authors argued that the concept should be broader, including the competitive environment and the firm's capabilities to respond to customers' demands (Ansoff, 1965; Mintzberg, 1994). A new term, "market orientation," was introduced to clarify this distinction. Over time, the concepts of "customer orientation" and "market orientation" have been used interchangeably (Korhonen, 2016). Sometimes, these concepts have been treated as synonyms (Deshpande et al., 1993; Berthon et al., 2004). Narver and Slater (1990) regard customer orientation as one dimension of market orientation. They argued that in a market-oriented firm, the entire organization is focused on meeting customer needs through three dimensions: customer orientation, competitor orientation and inter-functional coordination. Still, customer orientation remains the core focus, and later, many marketing scholars regarded customer orientation as the most fundamental component of a firm's performance (Narver et al., 1990; Woodruff, 1997; Kirca et al., 2005; Frambach et al., 2016).

Customer orientation is defined as "*the sufficient understanding of one's target buyers to be able to create superior value for them continuously*" (Narver & Slater, 1990, p. 21). This implies that customer-oriented firms gain competitive advantage by learning from the customers and by responding with goods and services that consistently offer the customers superior value and greater satisfaction (Brady et al., 2001).

Customer orientation goes beyond information processing, requiring "*interfunctional mechanisms which impregnate that information and translate it into specific action*" (Saura et al., 2005). This interaction between a firm and a customer helps a firm to understand the customer's business environment and changes within it (Payne et al., 2008). To turn the interaction into customer value, firms need to identify, assess and address specific customer needs, as well as to react proactively to customers' changing and emerging demands (Lenka et al., 2017). In other words, there are two requirements for a firm's capabilities. First, the firm must have a capability to gain knowledge about customers' needs and to implement actions to satisfy these needs (Day, 2000). This capability refers to knowledge about customers' current, latent and future needs, which are potentially important but may be difficult for the customer to describe (Slater & Narver, 1998; Blocker et al., 2011). Continuous sensing of customers' latent and future needs also may result in innovation; thus, these needs are considered a consistent driver of customer value (Blocker, 2011). The second capability requirement is a willingness and an ability to adapt the business to meet changing customer needs (Gatignon & Xuereb, 1997; Eggert et al., 2006). This requirement implies that customer orientation is part of organizational culture (Deshpande et al., 1993; Homburg & Pflesser, 2000), which affects an organization's values, norms, artifacts (e.g., stories, rituals) and behaviors (Homburg et al., 2000). In addition to providing an offering that fulfills

or exceeds the customers' expectations, customer orientation can comprise several other components, such as committing to customers, measuring customer satisfaction and understanding current and evolving customer value chains (Narver et al., 1990).

The concept has been criticized for being extensive, varying from incremental to trivial business development efforts (Bennett & Cooper, 1979), or threatening firms' leadership positions if they listen to their customers too mechanically (Christensen & Bower, 1996, p. 198). This criticism indicates that a firm has to find an optimal level of customer orientation, over which the added customer orientation does not offset the added value (Narver et al., 1990). For example, many firms seem to underestimate, misunderstand or overlook customers' needs (Blocker, 2011). This may result in firms losing their opportunity to adapt to the changes in customer demand faster than their competitors (Flint et al., 2002). Higher customer orientation, in turn, does not always lead to higher customer value. If a firm focuses too heavily on current customers' existing needs (Christensen & Bower, 1996), it may lose its opportunity to find new alternatives (Im & Workman, 2004). Value can be also destroyed (Grönroos, 2011b). Value creation is highly associated with the practices and persons executing an interaction (Guenzi & Troilo, 2007), as well as with the firm's capacity to manage this interaction. Understanding a customer's needs and wants increases the firm's understanding of how to contribute to the customers' value creation process, or alternatively, which of its actions debilitate value creation (Grönroos, 2011b). Thus, firms can apply customer-oriented business strategies in many ways and the decision is always firm-specific (Korhonen, 2016).

#### **2.4. Approaches to value creation**

Value is a demand-side concept (Peteraf et al., 2003). No consensus definition exists for the term (Lindgreen et al., 2012), and sometimes the concept has even been criticized as being elusive (Woodall, 2003). However, most conceptualizations identify a trade-off between benefits and sacrifices as perceived by the receiver (Zeithaml, 1988). Contemporary literature also identifies two distinct perspectives on value creation: value delivered by an offering (i.e., goods and services) and value of relationships (Lindgreen et al., 2012).

Value delivered by an offering has also been labelled as "industrial value" (Schlesinger & Heskett, 1991) and represents goods-dominant logic (GDL) (Vargo & Lusch, 2004b). According to this logic, a firm's primary focus is on producing and selling products and services in which value is embedded during the production process (Saarijärvi et al., 2014). Customers are seen to "destroy" this value in the consumption process (Porter, 1985). In other words, a firm's role is to provide an offering that best fits the customer's processes, and afterward, it is a customer's responsibility to make effective use of this given resource (e.g., equipment) (Grönroos, 2011a). The customers evaluate the difference between benefits (e.g. quality, functionality and utility) and costs (e.g., price, owning cost, installation, training, repair) (Vargo & Lusch, 2004a, 2008b; Keränen & Jalkala, 2013). This implies that the customers' value perception is determined both by monetary benefits (Terho et al., 2012) and by the use value. This perception is highly affected by how well the offering manages to fulfil the customer's needs in use situations (Woodruff, 1997). The goods-dominant strategy can be viable if a firm has gained a permanent technical advantage or its costs are permanently lower than its competitors (Grönroos, 2007). The firms applying this logic strive for higher efficiency, but there is a risk of competing prices (*ibid.*).

Over time, value creation in relationships has gained a foothold (Ulaga & Eggert, 2006; Corsaro & Snehota, 2010). As the concept indicates, this perspective is based on the assumption that instead of value distributed by the provider to the customers, customer value is embedded in relationships. This means that customers evaluate perceived benefits throughout the relationship with a provider (Ravald & Grönroos, 1996). Both the dyadic relationship between the provider and the customer and connected relationships affect the customer's value perception (Walter et al., 2001). Numerous features influence this perception, reflecting both the core offering and organizational capabilities. These features include location, innovativeness of the supplier and future capabilities (Lindgreen et al., 2012). They also reflect product quality, delivery, time to market, service support, personal interaction, supplier knowledge and operation costs (Ulaga et al., 2006). Both tangible and intangible assets create value (Ulaga et al., 2006). Because the customers' needs and wants change over time (Day, 2000; Eggert et al., 2006), value is a dynamic and complex concept (Keränen & Jalkala, 2014), and it is always subjective (Vargo & Lusch, 2008a, 2008b). Thus, the parties in the relationship do not necessarily share similar perceptions of what creates value for the customer (Corsaro et al., 2010).

The discussion on value creation has progressed further, emphasizing a service view (Lindgreen et al., 2012). Scholars in the service marketing stream explain that instead of being created by production and distribution, customer value derives from co-creation (Grönroos, 2008, 2011a; Vargo & Lusch, 2004a, 2008b; Grönroos & Voima, 2013). New and innovative service-based business practices have been suggested to help firms meet customer needs and survive in competition (Saarijärvi et al., 2014). Core in these suggestions is that firms should take a broader, supportive role in the customer's value creation process (Grönroos, 2008). In this, technology provides new ways to form relationships between humans and digital devices (Gummerus et al., 2017). Next, the views on service-based businesses are discussed in more detail.

## 2.5. Service-based business logic

Since the 1970s, services have increasingly become a focal issue in economic exchange (e.g., Vargo & Lusch, 2004a, 2008b; Grönroos & Helle, 2010; Grönroos, 2011b, 2011a). Earlier, the marketing mix was the most recognized and used corporate model. This model includes the Four Ps of marketing: product, price, place and promotion (Grönroos, 1997). However, this model was insufficient in the changing business environment. Attention started to shift from value delivered by an offering to value created by a customer and by the provider-customer interaction, also expressed in terms of value-in-exchange and value-in-use. "Value-in-exchange" refers to firm value embedded in resources and realized during the sales process (Grönroos & Gummerus, 2014). "Value-in-use" emphasizes customer value realized during the usage of resources (*ibid.*). This difference triggered the development of service-based business practices (Saarijärvi et al., 2014), strongly challenging the traditional view (Saarijärvi et al., 2017). Value creation was increasingly interpreted in terms of service, and customer orientation was seen as its core and as the premise for value creation.

The close linkage between service and value creation required a conceptual clarification: making a distinction between service (singular) and services (plural) and highlighting the importance of the former. According to Grönroos and Gummerus (2014, p. 208), "*service is the use of resources in a way that supports customers' everyday practices – physical, mental, virtual, possessive – and thereby facilitate their value creation.*" Therefore, *service* (singular)

considers how a firm's offering (e.g., services, delivery, communication) can benefit the customer and create customer value and is a distinct concept from *services* (plural), which are vehicles for value creation, like goods. Thus, service is a perspective on value creation, while services can be viewed as a category of market offerings (Edvardsson et al., 2005). A service-based business is different from individual and organizational perspectives. For individuals, "service-based" means "a set of attitudes and behaviors affecting the quality of interaction between an organization's employees and its customers" (Hogan, Hogan, and Busch 1984, p. 167). From an organizational perspective, service orientation is a strategic approach, where processes and procedures are targeted to prioritize customer satisfaction, superior customer value creation, profitability and competitive advantage (Lytle & Timmerman, 2006). Often, B2B relationships have been considered distinct from business-to-consumer (B2C) relationships. In B2B settings, the business partners have more incentives to create long-term partnerships, emphasizing trust building and personal-level commitment (Handfield & Bechtel, 2002). This differs from B2C relationships, where a higher number of customers preclude creating a similar relationship. In service research, this dichotomy is increasingly blurred or even inaccurate (Wind, 2006; Dant & Brown, 2008; Vargo and Lusch, 2011).

Marketing literature divides business logic into three main perspectives that focus on customer value: service logic (SL) (Grönroos, 2007; Grönroos & Voima, 2013), customer-dominant logic (CDL) (Heinonen et al., 2010, 2015) and service-dominant logic (SDL) (Vargo & Lusch, 2004a, 2008b). In particular, SDL and SL are well established perspectives in marketing research (Saarijärvi et al. 2017). In addition, SL and CDL are similar and in many parts overlapping and complementary (Baron et al., 2014). All three perspectives acknowledge the importance of the interface between the customer and the service provider (Grönroos & Gummerus, 2014) and agree that value is a result of a process rather than an outcome (Grönroos & Helle, 2010). These views go beyond conventional customer orientation, as they mean "*collaborating with and learning from customers and being adaptive to their individual and dynamic needs*" (Vargo and Lusch 2004a, p. 6).

The perspectives have, however, different foci relating to the way in which value is created and the interaction taking place in the process. In SDL, both the provider and the customer participate in the value creation process in all circumstances and the value-creating role of the customer is ubiquitous (Vargo & Lusch, 2004a). Therefore, value is always co-created (Vargo, Maglio, et al., 2008). The role of goods is to enable access to the benefits offered by an organization and its competencies (e.g., knowledge and skills) (Saarijärvi et al. 2017). Thereby, goods are viewed as a mediator that are appliances in the value creation process (*ibid.*). Service logic considers the value-creating role of the customer primary and sees the co-creation as dependent on the actual interaction in the business relationship (Grönroos, 2007). In SL, goods are "*resources like other physical objects such as credit cards and airline seats: the firm makes them available for money so that customers in their own processes will be able to use them in a way that creates value for them, as individuals, households or organizations*" (Grönroos, 2006, p. 323). Thus, goods are viewed as value-supporting resources that require other resources (e.g., information) in order to transmit service (Saarijärvi et al. 2017).

Although marketing researchers' attitudes toward service orientation have been largely positive, these approaches have also been criticized. For example, SDL has been said to be too theoretical (e.g. Grönroos, 2011b; Kowalkowski et al., 2013). In turn, critics believe SL too strongly emphasizes an interaction between customers and a provider (Saarijärvi et al. 2017). However, in an increasingly digital world the nature of interaction changes as it may

not necessarily be immediate (Lenka et al., 2017). Compared to SDL, SL and CDL are more managerially oriented. CDL highlights the customer dominance and focuses on understanding customer activities and the engagement of providers in customers' processes (Heinonen et al., 2010, 2015). SL presents ten managerial principles summarizing the value creation in the service-based business (Grönroos & Gummerus, 2014). The starting point is a categorization of the provider's and the customer's actions into three spheres: the sphere of the provider, the sphere of the customer and the joint sphere (Grönroos et al., 2013). Customers' value creation takes place in the customer sphere in a cumulative process in which value can also be destroyed. Customers use resources (e.g., goods, service activities and information) in a way that supports their everyday practices (Grönroos, 1979; Grönroos & Gummerus, 2014). The provider's role, in turn, is to facilitate the emergence of customer value in the provider sphere (Grönroos & Gummerus, 2014), through service that integrates monetary or non-monetary resources (e.g., knowledge, skills, raw materials, technology) into an offering (Grönroos, 2011). Depending on the level of integration, the provider can either offer value propositions or directly influence customers' value fulfillment in value co-creation that occurs in the joint-sphere (Grönroos & Gummerus, 2014).

The interpretation of service in terms of value creation transfers the focus from individual services to service relationships and processes. There are, however, also important trends in individual services. One of the most influential trends is the servitization of manufacturing (Oliva & Kallenberg, 2003; Neely, 2008; Wilkinson et al., 2009). Here, "services" usually refers to immaterial offerings added to the core material offering to expand customer value and customer relationships. Servitization is a widely applied strategy in manufacturers' B2B relationships (Kowalkowski, Witell, et al., 2013; Lerch et al., 2015). Typically, this strategy is applied to achieve improved product performance, a closer relationship with the customer, an extended product life-cycle and regular revenue payments (Baines et al., 2014). Today, the service business is increasingly viewed as a successful way to increase product margins and to address more complex customer needs (Gebauer et al., 2005).

Challenges in servitization have aroused broad interest among scholars. Incremental investments in extending the service business do not necessarily lead to improved competitiveness. Gebauer et al. (2005) calls the situation a service paradox, where the returns fail to cover higher costs. Often the service paradox results from limited managerial motivation to extend the service business. A typical hindrance is risk aversion, which limits the managers ability to accurately estimate the expected rewards.

However, the advancement of technology supports servitization. A successful service business requires systematic identification of customers' needs (De Brentani, 2001), as well as coordinated and transparent processes for implementation (Gebauer et al., 2005). To address customer needs, big data presents business opportunities as it has become possible to collect large quantities of data during customers everyday activities (Mayer-Schönberger & Cukier, 2013). Information technology, particularly digitalization, provides powerful tools and mechanisms to enhance the development of customer-oriented businesses (Lenka et al., 2017). Instead of only applying different strategic frameworks, managers should integrate emerging (technological) opportunities into strategic management (Harris & Twomey, 2010).

## **2.6. Opening the process of innovation**

Innovation is considered the main way to achieve economic growth and competitiveness (Lawson & Samson, 2001; Zimmermann et al., 2016). A distinct concept of innovativeness,

“innovation” is the capacity to develop and implement new products (Ettlie & Rubenstein, 1981). Innovativeness depends on a company’s skills, capabilities, knowledge base and strategy (Garcia & Calantone, 2002). Innovation, in turn, refers to a process where companies acquire and utilize new ideas and knowledge to solve problems (Laursen & Salter, 2006). The literature often divides innovation into three categories: product, process and business systems. While production-oriented firms may benefit from individual product or process innovations (Gatignon & Xuereb, 1997), customer-oriented firms benefit from a combination of these three elements in their innovation activities (Crespell et al., 2006).

Traditionally, firms have tended to rely on internal resources in innovation, and innovation processes have taken place in the framework of formal research and development (R&D) (Hossain et al., 2016). As knowledge, an enabler of innovation, is increasingly distributed outside company boundaries, the concept of open innovation has challenged this traditional approach (Chesbrough, 2003). Acknowledging the large innovation potential of external actors (Klioutch & Leker, 2011; Lager et al., 2015; Pulles et al., 2015; Schiele, Veldman, & Huttinger, 2011), the open innovation literature highlights that useful ideas originate both from inside and outside the firm. As such, the idea of collaboration and the utilization of external knowledge in a firm’s R&D processes is not new. However, as early studies on collaborative development tended to be siloed, the open innovation concept aims to improve the understanding of synergies between a diverse set of external actors in the innovation processes (Bahemia & Squire, 2010).

Chesbrough (2006) conceptualizes open innovation as the purposive use of knowledge inflows and outflows, with the aim of accelerating internal innovation and market expansion. Although criticized as being “*old wine in new bottles*” (Christensen et al., 2005; Trott & Hartmann, 2009), and lacking a consistent theory (Gassmann et al., 2010), the emerging interest in new ideas and collaboration technologies makes the topic relevant (Remneland-Wikhamn et al., 2011). Consequently, academic research in the field of open innovation has rapidly increased over the last years (Linton, 2012; Nitzsche et al., 2016).

A central perception in the original idea of open innovation was that knowledge, and intellectual property rights (IPR) in particular, is a tradable asset (Chesbrough, 2003). Consequently, businesses may examine their IP portfolios and seek to sell or license out those intellectual assets that are not relevant for their core business. The early open innovation literature assumed that knowledge transfers from the customer to the provider, or vice versa, are mainly explicit. Recently, the concept of open innovation has been re-focused away from this one-way transfer to a bidirectional flow of both explicit and tacit knowledge (Paasi et al., 2014). By effectively utilizing both dimensions of knowledge (explicit and tacit), firms can gain sustainable competitive advantage (Johannessen et al., 2001). Holsapple and Singh (2001) remark that knowledge can yield competitive advantage for a firm, but only if designed and executed better than the firm’s rivals.

Opening a business to external actors requires the development of appropriate organizational structures and managerial practices (Colombo et al., 2011). Often, this necessitates committing to a wholly new strategy. The strategy should affect all levels of a firm (Gianiodis et al., 2010), striving for a high degree of collaboration (Baraldi, 2009) and relationship closeness (Primo & Amundson, 2002). Trust, in turn, enhances the conditions for cooperation as it contributes to personal commitment, non-coercive power and long-term collaboration (Handfield & Bechtel, 2002; van Echtelt et al., 2008). Confidential business relationships can facilitate access to a wider range of knowledge sources, including tacit knowledge (Adler & Kwon, 2002). For this reason, trust is regarded as one of the most important success factors for open innovation (Paasi et al., 2010).

Despite the new developments, an old warning by Alter and Hage (1993) is worth remembering: despite the many benefits that collaboration may provide for innovation, there are numerous associated problems. These are, for example, a loss of control, autonomy, legitimacy, stability, reputation, financial and competitive position, and delays arising from project management problems. Other sources of potential risks for the implementation of an open innovation-oriented strategy include high knowledge search costs (Laursen et al., 2006), a lack of ability to utilize external knowledge, knowledge leakage and opportunistic behavior (Rosell, 2014). Opportunistic behavior may come into question, for instance, in the case of dependency with respect to the other party in the relationship (Jean et al., 2012; Schiele, Veldman, & Huttinger, 2011). Dependency means the other party's reliance on access to the counterpart's scarce resources (Pfeffer & Slancik, 1978). Just as a supplier may become dependent on a buyer, a buyer may become dependent on a supplier.

## **2.7. Leveraging digitalization to enhance customer orientation and innovation**

In the increasingly complex business environment, firms' ability to utilize existing knowledge for innovativeness is one of the most significant factors affecting their performance (Brockman & Morgan, 2003). A widely accepted characterization of knowledge is a three-tier hierarchy of data, information and knowledge (Ragab & Arisha, 2013). Knowledge (meaningful information) is always based on information (organized set of data), which, in turn, is based on different datasets and data (raw facts) (Bhatt, 2001; Stevens et al., 2010). Information is an invisible asset that enables firms to leverage their other resources (Tippins & Sohi, 2003), but as such it does not guarantee the growth of organizations' knowledge bases (Stevens et al., 2010). In contrast, knowledge leads to increased competitiveness because it consists of "*unique patterns of interactions between technologies, techniques, and people,*" making it difficult for competitors to imitate (Bhatt, 2001, p. 70). A firm can build competitiveness based on its collective knowledge-base and on how effectively and how fast this knowledge is acquired and utilized in business (Davenport & Prusak, 1998). This makes both *time* (Ragab et al., 2013) and *technology* closely related to the value of knowledge.

By developing information technology infrastructures, firms can gain an access to knowledge, particularly to tacit knowledge (Cavusgil et al., 2003). Converting knowledge into actual value is critical and the challenge resides in identifying the appropriate knowledge (Malone, 2002). Personal-level tacit knowledge can be transferred into organizational-level explicit knowledge (Johannessen et al., 2001) through information acquisition, dissemination and shared interpretation that develops organizational memory (Tippins et al., 2003). This transference enables firms to adjust processes, products and services to develop new offerings or innovations (Gassmann & Zeschky, 2008; Nysten & Holmstrom, 2015) and to build customer value (Martelo-Landroguez & Cegarra-Navarro, 2014).

As a growing body of literature describes how digitalization, also known as digital transformation, is disrupting business models in various industries (Kowalkowski et al., 2013; Lerch & Gotsch, 2015; Beier et al., 2017). Servitizing manufacturing is one industry that experiences important changes. Although transactions and communications within and between firms have been based on digital technologies for decades (Fedorowicz & Konsynski, 1992), the ability to act faster and differentiate from competitors has made digitalization a priority for managers and policymakers (Legner et al., 2017). Parviainen et al. (2017, p. 64) conceptualize digitalization as "*changes in ways of working, roles, and*



*business offering caused by adoption of digital technologies in an organization, or in the operation environment of the organization.*” Thus, digitalization is enabled by digital technologies, or combinations of information, computing, communication and connectivity technologies, enabling an interconnection of products, processes and services (A. Bharadwaj et al., 2013). Advanced digital technologies allow firms to accelerate speed, reduce costs and integrate customers as co-designers and co-producers of value (Sambamurthy et al., 2003). Digitalization goes beyond turning current processes into digital versions of those processes (Parviainen et al., 2017): it is business-centric, aimed to improve customer focus (Matt et al., 2015) and should be not misinterpreted as a firm’s IT strategy (Parviainen et al., 2017).

The digitization of society changes business fundamentally. First, digitization changes customers’ demands as they expect availability of digital services (Langer, 2017). Second, firms must adapt their offerings, delivery mechanisms and entire organization to satisfy this demand (*ibid.*). According to Parviainen et al. (2017), digitalization offers three methods of business transformation: (1) improved internal efficiency (processes), (2) new product-service offerings and (3) the development of completely new ways of doing business. For example, digitalization can be used for building infrastructures within value chains, which enable quick and effective ways to acquire and disseminate information from various sources (Tippins et al., 2003). By analyzing this information, firms can decrease the level of human intervention and improve internal efficiency (Lejeune & Yakova, 2005; Zimmermann et al., 2016). This can lead to the elimination of manual steps, improved process accuracy, shortened response times, more efficient storing and distribution (Parviainen et al., 2017), and processes optimization (Porter & Heppelmann, 2014). The new offerings can apply to analyzed customer data used to create business intelligence (Parviainen et al., 2017) or to new functionalities added to the offering (Porter et al., 2014). The broader and deeper use of individuals’ unique and dispersed knowledge following from digitalization provides better premises for innovation (Brynjolfsson & McAfee, 2012). Since innovations contain specialized knowledge from various disciplines, their distribution and transformation across geographical, physical and organizational boundaries has become more efficient (Remneland-Wikhamn et al., 2011). The development of completely new ways of doing business includes interactive platforms. These platforms, enabled by digitalization, foster engagement with customers and support the firm’s role as a co-creator of customer value (Matt et al., 2015; Parida et al., 2015).

According to Matt et al. (2015), successful digital transformation requires the close alignment of four dimensions: (1) the use of technologies, addressing a firm’s attitude toward new technologies and its ability to exploit them; (2) changes in value creation that are often connected to the adoption of new technologies; (3) structural changes, concerning the integration of new digital activities into a firm’s other structures and (4) financial aspects, as either a driver or a bounding force for the transformation. Transition to the digital era may necessitate the gradual transition of today’s IT functions from the role of service provider to enabler and innovator (Legner et al., 2017). This transition introduces the following requirements for capabilities of the IT function: (1) innovation, improving responsiveness to dynamic market developments (e.g., customer-centric collaboration, innovation management, flexible processes), (2) design, enabling customer-oriented software solutions and (3) transformation to drive the changes throughout the organization (*ibid.*). Most importantly, digital transformation requires consistent processes and knowledge management in firms (Berman, 2012). It is not self-evident that investments in digital technologies always pay off. Several studies indicate that while technical understanding is required, organizational capabilities are more critical to a successful outcome (Bharadwaj et al., 2013). These

capabilities include organizational learning (Tippins et al., 2003), leadership style (Seah et al., 2010; Verdú-Jover et al., 2014), and a firm's adaptive organizational culture (Alos-Simo et al., 2017). The whole organization should be involved in the change process, including operational processes, resources and internal and external users (Henriette et al., 2015).

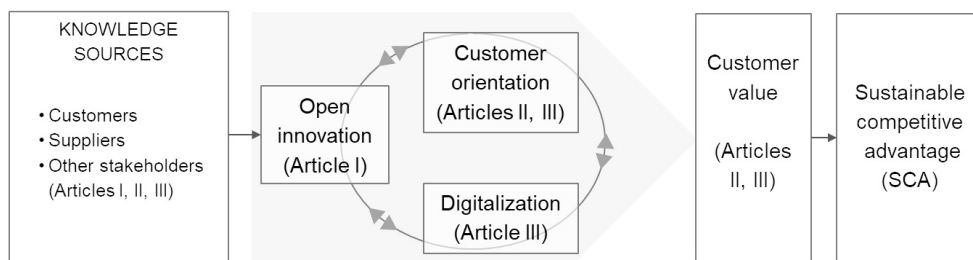
If emerging technological advancements are neglected, firms in highly competitive industries are at risk of losing business opportunities (Parviainen et al., 2017). Kodak is often used as an example of a firm that failed to adapt its business according to disruptive technologies. This formerly strong and technologically advanced firm severely misjudged the future potential of digital photography business, pioneering its development. For this reason, the company filed for bankruptcy protection in 2012. Similarly, studies have been conducted about how firms have created irreversible consequences by locking themselves into a certain way of managing business, limiting their ability to see and react to changes in customers' needs (Das & Teng, 1999) or take into account new emerging technologies (Barr et al., 1992). Firms' vulnerability to market changes and technological shifts is real as market barriers become lower for new disruptive competitors (Henriette et al., 2015). However, the same changing business environment may create new opportunities to expand existing business if a company has the ability to adjust its business model accordingly (*ibid.*)

### 3. RESEARCH DESIGN AND METHODOLOGY

#### 3.1. Study framework

The issue of escaping the commodity trap is pivotal for many traditional industry sectors, not the least the forest industry. For decades, the sources of competitiveness have been argued to rest on customer orientation and dynamic processes (i.e., continuous learning and innovation) over static efficiency and focus in production (Porter, 1994; Teece et al., 1997; Teece, 2007). As one of the most popular topics within marketing research, customer orientation is used as a strategic approach to examine opportunities for wood products industry's business transformation and to gain sustainable competitive advantage (SCA).

Figure 1 illustrates the theoretical framework and the focus of the sub-articles in this thesis. The SCA derives from a firm's capability to respond to the opportunities of the business environment with resources that are difficult or costly for peers to imitate (Barney, 1991). The resources refer to organizational skills and knowledge. To achieve the SCA, a firm needs to create and maintain an organizational culture that most effectively and efficiently pursues superior value creation for its customers (Narver et al., 1990). Customer orientation represents such organizational culture (*ibid.*). Closeness to customers fosters learning from their needs and the customers' business environment (Payne et al., 2008). This helps firms develop new solutions and innovations that offer superior value and greater satisfaction (Adams et al., 1998; Brady et al. 2001). Digitalization is an effective way to improve closeness to customers and customer value (Matt et al., 2015; Lenka et al., 2017). Abundance of data, technology leaps and dynamic processes allows broader and deeper use of individuals' unique and dispersed knowledge and forms a premise for open innovation (Brynjolfsson & McAfee, 2012). Valuable sources of knowledge are not restricted only to customers, but suppliers and other stakeholders can also help a firm build its knowledge-base. Thus, the sources of a firm's competitiveness are increasingly distributed outside the firms' boundaries, making the concept of open innovation important.



**Figure 1.** Theoretical framework and focus of the articles

To generate innovations, it is important to understand how to gain access to scattered knowledge outside firms' boundaries. Article I examines this topic by focusing on value creation in B2B relationships through open innovation. Suppliers are found to be increasingly involved in their customers' business, accentuating the role and value of long-lasting relationships (Windahl & Lakemond, 2010). The article examines the nuclear power industry, and its three key suppliers of mechanical engineering and manufacturing. The text provides information about how to increase external actors' (i.e., suppliers') willingness to share their ideas with a buying firm and, hence, to contribute to the firm's innovation process. This article serves as the basis for the whole thesis by exploring ways to gain access to distributed knowledge across the firm's boundaries. In essence, the goal was to understand how value can be created in relationships. This thesis raises and highlights the importance of efficient utilization of external knowledge to the firm's success. Although the research is based on empirical data from the nuclear power industry, it has similarities with the forest industry. Both are process-oriented, require heavy investments (e.g., plants, machines, equipment) and are dependent on various suppliers. Involving suppliers in the innovation process is not yet recognized in the forest research context; thus, exploring the phenomena in an adjacent industry is beneficial.

Articles II and III examine customer orientation in the framework of the wood products industry from two different viewpoints. Article II provides new knowledge about customer orientation and customer value creation from the perspective of sawmills' B2B customers. Article III examines how digitalization, today's major technological innovation, can be leveraged to improve customer orientation and customer value creation and, hence, help firms differentiate themselves from rivals. Digitalization provides access to customer data and allows management of complex customer interactions (Lerch & Gotsch, 2015; Matt et al., 2015). In this way, digitalization supports firms in identifying, assessing and addressing specific customer needs and creating innovations based on them.

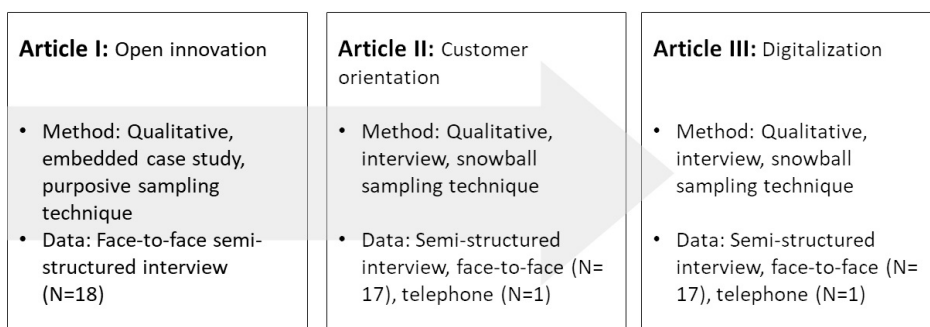
Contemporary literature recognizes service-centered business logic is increasingly important to meet complex customer needs. This thesis takes the service marketing view, and more specifically the service logic (SL) approach, to examine customer orientation and customer value creation. This approach was chosen because it is useful when seeking both theoretical insights and managerial guidance for the development of service-based business (Grönroos & Gummerus, 2014). Moreover, SL provides interesting avenues for examining business transformations from product-oriented to service-based business, the phenomenon underway in the wood products industry.

### 3.2. Qualitative case study as the method in this thesis

As suggested by Eisenhardt (1989) and Yin (2014), exploratory research is recommended when the topic is new with little related knowledge. Customer orientation and innovation have been extensively studied, but significant gaps in the understanding of these phenomena remain, especially when considering specific industry sectors, such as wood products. Moreover, digitalization is a new and growing topic in several research disciplines, yet empirical research in this area is scarce and lacks a strategic perspective (Montague et al., 2016; Nilsson et al., 2017). In forestry business research, the resource-based view (RBV) has been typically used as the conceptual framework. However, researchers have argued that the RBV has reached maturity as a theory (Barney et al. 2011). Significantly less is known about the potential of business logic focusing on customer value and service. Theories like service logic (SL) have only rarely been used for the study of renewal in the wood products industry. On these grounds, exploratory research was considered appropriate for this thesis.

More specifically, the thesis applies qualitative research, employing case studies and interview methodology. Although qualitative research has limitations concerning statistical generalizability, its strengths are apparent when the purpose is to understand a context and meaning of a subject (Maxwell, 1996), as well as the evolution and changes over time (Gephart, 2004). Case study is a popular exploratory research strategy when there is a need to explore phenomena in depth and little is known about the phenomena (Eisenhardt 1989; Yin 2014). According to Halinen and Törnroos (2005, p. 1286), the case study is an empirical research approach that *“allow[s] the study of contemporary phenomenon, which is difficult to separate from its context, but necessary to study within it to understand the dynamics involved in settings.”* This approach provides several advantages, such as flexibility, richness and possibility to locate meanings in natural settings (Miles & Huberman, 1994). Despite criticism regarding generalizations of case study observations (Yin, 2014), learning from case studies is a strength if they are conducted with care (Dubois & Gadde, 2002). This includes strong reliance on theory (Easton, 1995) and researcher objectivity (Yin, 2014). How these conditions are pursued in this study is described in the contexts of data collection and analysis. Interviews, in turn, are a highly efficient empirical data gathering method (Eisenhardt & Graebner, 2007). Interviewing is a widely used research method in social and organizational research, as it allows insights into people’s experiences, attitudes and perceptions (Yin, 2014).

Figure 2 presents an overview of the methods and data used in the individual studies (described in the articles). The study described in Article I relied on an embedded case study design, which allowed a thorough examination of the research problem, collection of comprehensive data and extensive analysis. This method should be selected when a single case involves different embedded units (Yin 2014), as in the first study. However, a common pitfall of an embedded case study design is subunits gaining too much attention, ignoring a holistic view of the case (Yin 2014). The studies described in Articles II and III were based on semi-structured interviews, part of which were carried out face-to-face and part via telephone. The sampling technique in the first study was purposive, while the other two studies followed snowball sampling.



**Figure 2.** Summary of data collection and methods

### 3.3. Data collection

The data for this thesis were collected from 2014 to 2016 in two research projects funded by the Finnish Funding Agency for Innovation, *Tekes*. The projects were “Supplier Innovation Management” (Article I) and “Value added by optimal wood raw material allocation and processing” (<http://www.varma-eu.com/>) (Articles II and III). The data consist of, in total, 36 semi-structured interviews conducted in Finland. The number of interviewees in the first study was 18. The second and third studies used the same interview material (just from different angles) and the number of interviewees was also 18. The majority of interviews were carried out face-to-face; only one interview was conducted via telephone. The semi-structured form of interviewing was chosen as it allows respondents to freely voice their opinions. Both face-to-face and telephone interviews are generally considered acceptable methods for data gathering (Aday & Cornelius, 2006), but the former enables the collection of more in-depth data based on deeper interaction. The attempts to reduce the interview bias included avoiding signals of approval or disapproval during the interview and avoiding affecting the interviewee’s responses by any means (cf. Kreuter, 2008). Two researchers were present in the majority of the interviews. By incorporating two interviewers, potential sources of error caused by the interviewing method were diminished in two ways. First, this practice enabled one interviewer to focus on the questions while the other interviewer took notes. Second, the second interviewer was able to ask specifying questions during the interviews to gain a better understanding of the subject matter.

### 3.4. Case selection and data collection in the case study

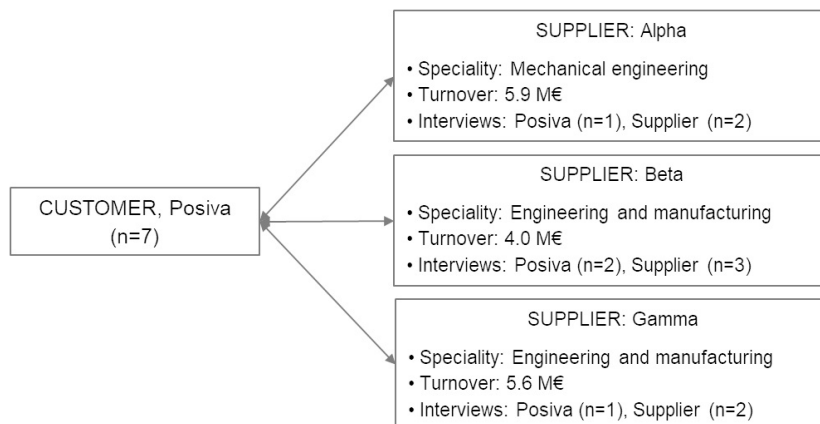
The case selection in the first study (Article I) was affected by its uniqueness as a strongly innovation-oriented buying firm that has extensive experience in collaborating with a large number of suppliers in various development projects. The selection criteria for the buying company in the first article were operating in a manufacturing industry with a great importance on innovations, reliance on external resources for innovation, and a demanding operating environment that includes high technological requirements. This context was expected to provide strong grounds for studying supplier innovation in a highly demanding

environment and to enable the acquisition of new theoretical insights into the factors that motivate suppliers to contribute to the buyer's innovation process. Moreover, these contextual characteristics were assumed to challenge the conditions for innovation because complex projects conceivably add uncertainty and risk that may impair the supplier's intention to take part in the buyer's innovation process.

We selected a firm that met these criteria, and the manager expressed a willingness to participate in the study. The buyer company was Posiva, which was founded with the aim to plan and build a final nuclear waste disposal facility in Finland. Posiva relies heavily on its suppliers to deliver highly specific innovative solutions. Hence, they do not innovate per se, but they provide specifications and requirements to the suppliers, after which Posiva manages the development projects. As a result, Posiva only has a limited amount of internal R&D, making it reliant on external knowledge. Posiva agreed to be identified in the study. However, as the individual customer relationships are confidential, the names of suppliers were not mentioned.

The embedded case study was based on dyadic data collection of three buyer-supplier relationships between the focal case company and its three key suppliers (see Figure 3). The second step was to select the suppliers. The key informants in embedded cases were selected by using a purposive sampling technique (i.e., identifying key, and hence knowledgeable, people in each business relationship). Data was gathered from both ends of the relationship to gain a valid assessment (John & Reve, 1982; Wilson, 1996). The suppliers were selected according to their collaboration history and strategic importance to Posiva. To increase the external validity of the findings, suppliers from different industries (i.e., categories) were selected. They were small mechanical engineering and manufacturing firms with annual turnovers between four and six million euro. The purpose was to involve additional suppliers later, if necessary. However, the limit to manage amount of data from three dyads was soon reached.

The third step was to select the interviewees, who were identified by the buying company. The suppliers also nominated additional people to participate in the study. The suppliers' informants were the Business Unit Manager, Project Manager, Engineering Manager, Sales Manager, Technical Manager and Product Development Engineer. Within each dyad, both the buyer and suppliers' perspectives in the dyadic relationship were considered by interviewing individuals working in the buyer-supplier interface. The interview protocols consisted of four main thematic blocks: (1) the background of the interviewee and the collaboration history, (2) experiences from the collaboration (satisfaction, trust, attractiveness, flexibility, collaboration practices, industry specific demands and effects), (3) future visions for collaboration (goal of collaboration, commitment) and (4) contributions to supplier innovation (information sharing, communication, learning, involvement in product development, development needs to enhance supplier innovations). The purpose of Sections 2 through 4 was to collect interviewee perceptions of the mechanisms and processes that were expected to affect open innovation, based on previous literature. Section 2 provided insight into the current attraction and satisfaction, Section 3 gathered information on future prospects and Section 4 garnered insights into ways to improve project and knowledge management processes to enhance supplier innovation. As the dyad perspective was emphasized, the main topics in the buyer and supplier questionnaire were similar. The interviews were conducted from August 2014 through September 2015.



**Figure 3.** The three embedded cases in Article I

### 3.5. Sampling and data collection in the interview studies

The focus of the second and third studies (reported in Articles II and III) was the sawmill industry. However, because integrating supplier and customer processes is an essential part of customer value creation (Holbrook, 2006; La Rocca et al., 2014), the value chain (wood supply, sawmills, secondary wood processors, and industrial end-customers) perspective was chosen to gain a systematic and in-depth understanding of the prevailing state of sawmills' business logic and its possibilities to benefit from customer orientation and digitalization. Moreover, the interest was in the sawmills and their customers, but it was to interview the wood supply, too, as it has notable impact on the whole value chain's profitability.

The population of interest was criterion-based: top executives or experts in wood value chains. Thus, a purposive sampling technique was used to reach the target population (Patton, 2002). This strategy is suitable for small-scale and in-depth studies (Ritchie et al., 2003). The criteria to ensure that the most knowledgeable people were incorporated (Guarte & Barrios, 2006) were as follows: (1) the respondents had to represent upper management (top executives or experts in the wood products industry), (2) the respondents of the firms were regarded as innovators or as representatives of growth-oriented firms, (3) firms of different sizes were incorporated to ensure diversity among the informants and (4) these firms also represented different downstream processed products and industrial end-uses. To be in line with the articles' research interests, the scope was restricted to B2B relationships. As the respondents were expected to be innovators or represent growth-oriented firms, it was assumed they would be the most knowledgeable people regarding customer orientation and digitalization within the industry.

The identification of interviewees was pursued via a subtype of purposive sampling: snowball sampling (cf. Patton, 2002). This sampling technique diminishes the risk of researchers' misjudgment in the sample selection and supports the involvement of the most knowledgeable people regarding the phenomenon of interest (Guarte & Barrios, 2006). A steering group was used as a starting point for collecting a list of suitable interviewees by asking for suggestions. The group consisted of six people in the positions of Sawmill Manager, Sawmill Development Manager, Chief Technology Advisor at the Finnish Funding

Agency for Innovation, Principal Scientist at VTT Technical Research Centre of Finland Ltd., Sawmill Industry Senior Advisor and Managing Director at the Federation of the Finnish Woodworking Industries. The interview portion of the research started with three interviews at industry associations to gain a better understanding of the business and to obtain recommendations for other interviewees. Asking for recommendations continued during the rest of the interviews. More precisely, the respondents were asked who they could recommend based on the criteria of the study.

Table 2 illustrates the study sample and includes the number of interviewees, the business type, the interviewee's position and the firm size. The sample consisted of 14 firms in Finland, being versatile in terms of interviewee positions and specialties. The versatility was intended to ensure that all key categories relevant to the subject matter were covered and that each category was as diverse as possible (Ritchie et al., 2003). This enabled us to capture a wide range of different perspectives to detect differences within, as well as between, categories (Ritchie et al., 2003), as the aim was to gain a broader understanding of the phenomena studied. This was significant to improve the reliability and validity of the study. The informants represented small-, medium- and large-sized supplier and customer firms in wood supply, sawmills and secondary wood processing, as well as the construction industry, the sawmills' main industrial end-customer segment. The industrial end-customers were manufacturers of prefabricated houses and apartment buildings specializing in wood buildings. The key informants worked in the wood products industry and were industry experts, CEOs, Development Managers, and other Vice President level executives. The number of informants was low in wood supply. However, all sawmills had wood supply integrated into their other businesses, which enabled discussion of the limitations and possibilities of wood supply in the sawmill interviews.

**Table 2.** Summary of interviews in Articles II and III

Sector	Sector's specialty	Position	Turnover, M €
Wood supply, (n = 2)	-	Business development manager Development manager	> 1000 > 1000
Sawmill, (n = 6)	-	CEO CEO Development manager SVP, Timber sales Manager, Investments & Technology CEO (industry association)	16 13 264 > 1000 > 1000 -
Secondary processing (n = 6)	Planing of wood Wood components Glulam Windows, doors	CEO CEO CEO Manager, operations and sales CEO (industry association) Specialist (industry association)	1 1 5 135 - -
Industrial end-user (n = 4)	Prefabricated houses Prefabricated houses Prefabricated houses Building construction	CEO CEO CEO CEO	9 12 21 25



The empirical data in the second and third studies (Articles II and III) was collected between September 2015 and September 2016. The data was collected during the same interviews by using two partially overlapping interview protocols. The following key thematic blocks were similar: the general overview of the business, sources of future competitiveness, customer orientation and customer value drivers. The rest of the themes were different. In the second study, the specific themes were development needs for customer orientation in the company's business and in the sawn timber value chain. In the third study, the specific themes concerned internal and external information needs and digitalization transforming the business.

The questions for wood supply, sawmills, further processing, and industrial end-customers were modified according to the interviewed sector's position in the value chain. For example, in the second study, the focus in the sawmills' interview protocol was on sawmills' perceptions of their current customer orientation as well as on factors that were assumed to create value for their customers. In the sawmills' customers' interview protocol, the focus was on the customers' needs from their suppliers and how well the suppliers were able to fulfill those needs. In turn, the interview protocol for wood supply was differentiated from the two above-mentioned groups by focusing on wood procurement practices and the interviewees' views about how they could improve sawmills' customer orientation. In this way, a systematic and comprehensive understanding was achieved of the stakeholders' needs, firms' capability to meet those needs, and their interactions. Also, the purpose was to understand how wood supply could possibly limit or enhance the sawmills' customer orientation.

### **3.6. Data analysis**

The interviews were recorded, transcribed and coded in all three studies. Also, field notes were taken during each interview and contained key comments and points made by the interviewer. In the first phase of the data analysis, the interview notes were grouped by dyad (Article I) and a firm's position in the wood value chain (Articles II and III). This provided a basis for performing further analysis. All studies followed the approach of qualitative data analysis suggested by Miles and Huberman (1994), namely reducing data, displaying data, and drawing and verifying conclusions. As the authors remark, data reduction occurs throughout the analysis.

Next in all three studies, the interview transcripts were read through several times by two researchers; afterward, the key phrases and points were summarized. The purpose of summaries was to aid in detecting unique patterns of observations (Eisenhardt, 1989). Before further analysis, data reduction was conducted. In this process, data was categorized according to the individual studies' research goals. The first study (Article I) provided three units that were analyzed according to the following research question: how does one increase a supplier's willingness to share its ideas and contribute to the buyer's innovation process? In the first study, the data was organized according to the key factors affecting open innovation or supplier innovation. The classification was based on previous literature (Mayer et al., 1995; Gianiodis et al., 2010; Paasi et al., 2010; Colombo et al., 2011; Klioutch et al., 2011; Uyarra et al., 2014; Wagner & Bode, 2014) and included three main classes: social aspects, knowledge management, and practices and shared vision. The results were verified in steering group meetings and discussions with the participating firms.

The data in the second study (Article II) were analyzed according to the two research questions: (1) what are the needs of sawmills' B2B customers as defined by customers themselves, and how do these needs differ from the way in which sawmills see them, and (2) how could the business of sawmills be developed based on the direct (further processor) and indirect (industrial end-customers) customers' needs? The data in the third study (Article III) were analyzed from the following research questions' perspectives: (1) how could the utilization of digitalization improve customer-orientation and firms' competitive advantage within the wood value chains as defined by the industry stakeholders themselves, and (2) how should businesses be developed? In both the second and the third studies, the industry was divided into three sectors in the analysis phase: sawmills, secondary wood processors and industrial end-customers. Secondary wood processors refer to manufacturers of wood components, glulam, windows and doors and planed timber. Industrial end customers, in turn, refer to construction firms of prefabricated houses and apartment buildings, specializing in wood buildings. This was important because as the downstream value chain actors (e.g., building wood, carpentry) are closer to the end customers, they may have better knowledge of the end customers' needs. Therefore, this categorization helped clarify the actors' positions and roles within the wood products industry, as well as allowing for a comprehensive understanding of the factors that possibly impact the competitiveness of that industry. The interviews from the industry associations represented the sawmill industry (one interview) and secondary wood processing (two interviews). In the data analysis, these interviews were included in the sawmills group and the secondary wood processing group, respectively.

Thereafter, the data was categorized in the second and third studies as follows. In the second study, the data was categorized into three value driver classes (core offering, sourcing process, customer operations), using the construct suggested by Ulaga and Eggert (2006). This classification is particularly suitable when studying relationship value in a manufacturing context and when the perceived value occurs in value-in-use. In the classification, the relationship value is divided into two dimensions (benefits and costs). Only the benefit dimension was incorporated in the analysis because it contains larger potential for firm success relative to costs (Eisenhardt, 1989). In the third study, the data were categorized into three potential levels of digitalization, impacting the business and corporate ways of working: internal efficiency, external opportunities and disruptive change. This categorization was suggested by Parviainen et al. (2017), and it is particularly suitable when studying relationship value and the perceived value-in-use in a manufacturing context. Internal efficiency relates to process efficiency by renewing internal processes through digital means (e.g., improved quality and consistency, a real-time view on operations, and data integration from internal and external sources). External opportunities refer to new ways of doing business and to the emergence of new business opportunities in existing business domains (e.g., new customers, new services or advanced offerings to customers, and improved response time). Disruptive changes transform business roles completely (e.g., the termination of old business and the emergence of new business). The conclusions drawn from the data analysis were verified by the project steering groups and in discussions with industry experts.

## 4. SUMMARIES OF THE RESULTS

### 4.1. Article I: Stimulating supplier innovation in a complex and regulated business environment – a dyadic case study

Article 1 (Makkonen et al., 2017) includes the results of the first study of this thesis. The article analyzes ways to foster innovation, and customer value, by gaining access to specific external knowledge source of a firm: the knowledge owned by suppliers. This is referred to as supplier innovation. The study is based on recognition that suppliers are critical sources of innovation (Klioutch et al., 2011; Lager et al., 2015; Pulles et al., 2015; Schiele, Veldman, & Huttinger, 2011), implying the usefulness of an interactive process through which the relationship value is created. Although previous studies identified several success or restraining factors of supplier innovation, much of this research has focused on the buyer's viewpoint. It has assessed mechanisms for "pulling" innovations from a supplier and, hence, presumed that the buyer actively participates in the supplier's innovation process (Wagner & Bode, 2014). However, the phenomenon from the supplier's viewpoint has not been examined (Schiele et al., 2012; Smals & Smits, 2012).

The focus of this study was on the factors that may increase suppliers' willingness to contribute to the buyer's innovation process. The conceptual basis of the study was in open innovation literature, more precisely in its broad interpretation. This interpretation does not only focus narrowly on trading intellectual assets, but more broadly focuses on two-directional information flows between the buyer and the supplier. These information flows aim at gaining access to tacit knowledge and achieving competitive advantage. The distinction between narrow and broad interpretations of open innovation corresponds to the distinction between innovations created by and with suppliers (Gallouj, 2002). The data were collected from industry experts in mechanical engineering and manufacturing in three buyer-supplier relationships. This was the largest possible amount of dyads within the project budget and the timetable. Although the study was not conducted in the forestry context, it supports the thesis by analyzing efficient utilization of knowledge in a neighboring sector.

The study contributes to the understanding of success factors of open innovation in B2B relationships. The decisive factors for engaging suppliers in the buyer's innovation process are not necessarily monetary (e.g., sales growth and access to new future markets); they can also be non-monetary (e.g., gaining experience). The empirical findings highlighted that customer attractiveness, namely perceived value from the relationship and the ability to build one's own knowledge-base, affects the supplier's willingness to invest in collaboration. If this attractiveness existed, the suppliers were committed to collaboration despite challenges in the buyer's knowledge management methods, collaboration practices or trust.

In addition to attractiveness, several other factors were identified that increased the supplier's willingness to contribute to their buyer's innovation process. A proper balance between project control and freedom to innovate was seen as decisive. However, the more complex the task, the more the buyer was expected to provide clear guidelines during the project for the suppliers. This indicates an importance of trust in cooperative relationships. Trust is important as it is one of the key success factors in collaboration and it is a basis for open innovation (Paasi et al., 2010). For example, trust enhances information sharing, aligned goals and visions. Particularly, the buyer's trust in the supplier's abilities (skills and competencies) seemed critical to stimulate suppliers to innovate. One of the key requirements in this context was that the buyer has sufficient practical knowledge of the subject area.

This study confirms earlier views about the criticality of information transfer. The findings enable a fluent progress of the innovation project and support organizational learning, but only if the firm has an ability to utilize external knowledge (Rosell, 2014). To foster two-way information transfer, organization-wide positive attitudes toward external knowledge and its sharing are necessary (Nitzsche et al., 2016; Rosell, 2014), in addition to trust. As the motivations for collaboration may not always be reciprocal, both the buyer and the supplier need to understand why the cooperation is taking place and what advantages are expected. Then, they should make efforts to commit to a common goal.

#### **4.2. Article II: Customer value creation in B2B relationships: Sawn timber value chain perspective**

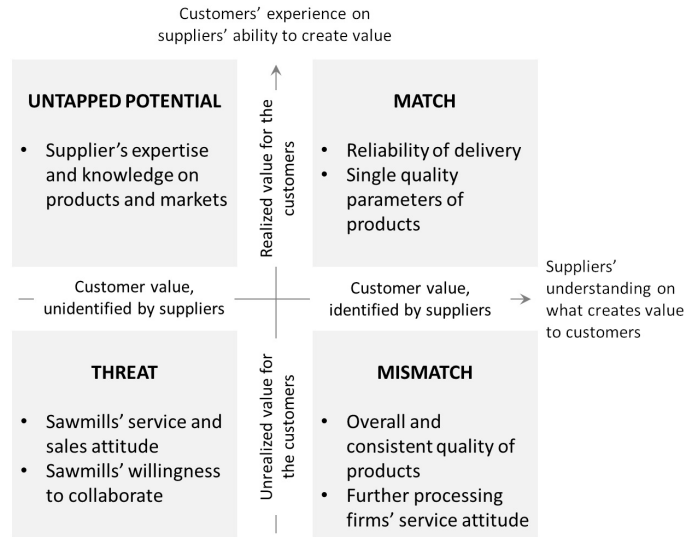
The second study, reported in Article II (Makkonen & Sundqvist-Andberg, 2017), examines customer orientation, value creation and supplier-customer perceptions on customer needs in the sawn timber value chain. The motivation for the study was to better understand the customers' needs in order to develop service-based businesses in the sawmill industry. The findings are based on the views of different stakeholders in the value chain: wood supply, sawmills, secondary wood processing and construction industry. Involving informants throughout the value chain enabled a systematic and in-depth understanding of the prevailing state of sawmills' business logic and customer needs. Therefore, not only sawmills benefit from the results; wood supply and secondary wood processing also benefit.

The study resulted in three main findings. First, *sawmills have an untapped potential to improve customer satisfaction*. According to results, the majority of sawmills recognized the importance of customer orientation for the firm's success. Measures to address customer satisfaction focused on improved material offerings (e.g., product quality, delivery and price) or value-added services (e.g., product customization, painting and wood impregnation). The sawmills believed that their current total offering (products and services) corresponded relatively well to their customers' needs. In regard to the core offering, this supposition also seemed valid among the customers and stakeholders. However, the customers claimed that sawmills, especially larger ones, failed to notice that customers' needs are manifold and extend beyond products and processing (including sourcing processes and customer operations). Smaller sawmills were seen to operate in a more customer-oriented manner by ensuring flexibility in the form of product customization and delivery. Overall, the other value chain actors perceived the sawmill industry as traditional and reluctant to change. Customer expectations of the suppliers increased along the sawn timber value chain. The industrial customers, being closer to the end-use, emphasized not only high-quality products but also interaction, collaboration and service attitude. They understood that value should not be seen as delivered but co-created during supplier-customer interactions, which is in line with the service logic. The ways to unleash this untapped potential are explained next.

Second, *the results enable the creation of a customer value matrix*. This matrix ranks development needs in the sawn timber value chain by grouping the key findings into four categories: untapped potential, match, mismatch and threat (Figure 4). The untapped potential describes a situation in which the suppliers' (sawmills' and secondary processors') understanding of their customer needs is limited or the created value is embedded or emerges in customers' processes, making it invisible for the provider company. However, customers considered that suppliers have the ability to create value, such as sawmills' profound technical expertise on wood or sawn timber. In the categories of match and mismatch,

suppliers were able to identify true customer needs. For example, suppliers believed reliability of delivery and product quality create value for customers. The customers confirmed this view, but they specified that the suppliers were successful in delivering needed quality in single cases and in a fragmented manner. The study revealed that even though suppliers emphasized high overall and consistent product quality, the customers might be rather unsatisfied with the actual sawn timber quality. This is an example of a mismatch category, where the suppliers are not able to either realize or communicate value to the customers. In the category of threat, the suppliers did not understand their customers' needs, and therefore, these needs were neglected. Sawmills' willingness to collaborate is an example of such a situation. This relates closely to another key aspect regarding threat and the mismatch situation: expected and perceived service attitude. While secondary processing firms recognized the importance of service attitude as a source of value, their ability to create relationship value was limited. The worst case was sawmills that neither identified the importance of a strong service attitude nor were able to create this kind of value. In this study, service attitude means genuine interest in the customer's business, collaborative attitude and close interaction.

Third, the study indicated that *wood suppliers' motivation to meet and even exceed sawmills expectations could be improved if the sawmills could make better use of high quality raw material*. The profitability of the wood value chain is largely affected by the wood suppliers' ability to fulfil sawmills' requirements regarding timber quality, dimensions and length, and delivery times. According to the wood suppliers, the sawmills seem to lack the ability to benefit from improved raw material, which may decrease wood suppliers' motivation to improve quality and meet customers' expectations. The wood suppliers presumed that the situation will change, as they foresaw their customers demanding more specified wood characteristics, resulting in a need for ordering single logs. Current cutting orders at harvesters include target distributions for logs' lengths and diameters. As it is, current technical capabilities should be developed to detect a stem's internal quality before cut-to-length decisions. Some research relating to non-invasive scanning of tree stems (i.e., X-ray measurements) and optimal bucking has been carried out (Kivinen, 2004; Nordmark, 2005; Song & Usenius, 2007; Rummukainen, 2017). Practical applications could be available relatively quickly if the necessary investments are found to be viable.



**Figure 4.** Customer value matrix showing the potential to improve customer orientation in sawn timber value chain (Makkonen & Sundqvist-Andberg, 2017)

#### 4.3. Article III: Stakeholder perspectives on the business potential of digitalization in the sawn timber value chain

The third study, described in Article III (Makkonen, 2018), builds a bridge between the two previous studies by addressing operational effectiveness to improve customer orientation and innovation, thus finding ways to improve the wood product industry's long-term competitiveness. The study interlinks two perspectives on value creation that disrupt prevailing business models in traditional manufacturing industries, namely service logic and digitalization. The starting points of the study were the views highlighting the firm's ability to generate new knowledge through constant learning (Tseng, 2016) and to exploit knowledge to create superior customer value (Woodruff, 1997) as the key constituents of profitability. Digitalization is at the core of these endeavors, enabling the analysis of vast amounts of data, interlinking actors throughout the value chain and creating a fundamental change in current business operations (Parviainen et al., 2017).

The study includes three contributions. First, the research *introduces digitalization as a powerful tool to foster the development of customer-oriented business in the wood value chains*. Many interviewees recognized that customer demands are increasingly complex, and the industry should prepare to respond them in a new way. Some actions had been taken to more effectively exploit information and digital technologies. For example, collaboration practices and information transfer were developed to optimize raw material utilization. Research and development projects were launched to improve transportation efficiency and to gain more precise forest inventory data. Wood suppliers were one of the most advanced sectors pursuing these goals. This is not surprising, as the forest industry has traditionally invested in developing wood procurement operations with efficient information exploitation. The views of the sawmill industry were more unexpected. They presented advanced ideas on the utilization of information to completely renew business models. For example, the creation

of “a hub,” integrating demand information and optimizing deliveries in a business network, virtual “forest tours” or a real-time integration of customers into the manufacturer’s production process would break existing business models.

Second, *the wood products industry views digitalization positively or considers it necessary. However, to gain full benefit from digitalization, the industry must expand its potential beyond operational efficiency.* The respondents underlined the need for change and highlighted that one’s success in the wood value chain impacts the overall success of the industry. The term “digitalization” was understood in different ways. While some respondents perceived it to mean a change of currently existing processes into a digital format, and consequently into a more efficient transfer of data, others expressed more comprehensive and profound views about its potential, including a new way of thinking about business models. In all examined sub-sectors, most of the future actions seemed to target cost competitiveness (e.g., monitoring costs, improving the pricing of wood raw materials, resource optimization, improved process efficiency, transportation efficiency, warehouse monitoring and faster reaction times), leaving remarkable potential to differentiate from rivals through data analysis and novel business models. Ways to completely transform the business roles were presented significantly less frequently and only by wood suppliers (e.g., virtual forest tours) and sawmills (e.g., removal of unnecessary intermediaries).

Third, *the information needs in the wood value chains are manifold, emphasizing the importance of cooperation.* The information needs of wood suppliers, sawmills and secondary wood processors were related to the downstream value chain to improve their process predictability. Often the need was seen as a one-way flow of information without considering how they could help the other actors within the chain succeed. The industrial end-customers were the only sector emphasizing the importance of two-directional information transfer within the value chain. This two-directional information transfer was anticipated to have two primary effects on business. First, operational efficiency would increase, and second, customer satisfaction could be improved via faster deliveries. For example, the customer could benefit from knowing about suppliers’ delivery capacities. In turn, the customer could help their suppliers succeed by providing timely information about demand. These new activities would emphasize the need for collaboration within the wood value chains, a development that was also acknowledged by many other interviewees. The expected benefits were improved internal efficiency and improved profitability in the whole wood value chain. However, many respondents noted that traditional attitudes and unwillingness to change are major challenges when a business is transformed. Currently, the independent working method was seen to cause chain inflexibility.

## 5. DISCUSSION AND CONCLUSIONS

In this thesis, a broad scope of literature on customer orientation, service logic, digitalization and open innovation was used to inform forestry business research. This thesis contributes to wood products marketing and strategy literature by examining the potential benefits of open innovation (Article 1), customer orientation (Article 2) and digitalization (Article 3) to improve the sawmill industry’s long-term competitiveness. Moreover, the development needs to improve customer orientation within the industry were the focus of this thesis. An interaction with customers and suppliers and the following customer value creation were examined through the lens of SL. Forestry-related business studies, such value-based

approaches, have been previously examined in a B2C context, but not in B2B relationships. The motivation for this thesis was the observation that while service-based business practices have attracted attention from academics and business professionals in many disciplines and sectors, they have not gained popularity in the business models of the sawmill industry, nor have they focused on individual services or on the use value. There seems to be a particular lack of understanding about the potential of service (customer value) in business, or the way in which firms can support customers' value creation through integrating with customers.

This thesis suggests that by positioning customers at the core of the business, and applying service-based business practices, sawmills are in better position to achieve SCA. In summary, the sawmill industry's business strategy is product driven and firms are under price competition. This strategy may result in positive financial outcomes if demand is high, customers' demands are simple or competition is low (Hansen et al, 2011), or if a firm has gained a permanent technical advantage or its costs are permanently lower than its competitors (Grönroos, 2007). These are not likely trends. Thus, the sawmill industry should seek new ways to deliver customer value, or customer orientation. Although products, services and operative efficiency are important, their role as a part of a larger entity, or service, is different. The most important aspect of a business transformation is to understand the difference between product and service-based businesses. In the former, customer value is transmitted through a product that is assumed to meet a customer's needs. In the latter, customer value is embedded in relationships, not only between the firm and the customer, but also between the customer and other connected relationships.

The business transformation necessitates significant strategic changes: questioning existing practices and principles of the industry. This transformation begins with building organizational structures and management practices that integrate with customers and other stakeholders and center on customers' needs. Sawmills do not operate in isolation from their surrounding business environment. As much as their actions affect other value chain actors' profitability, the other actors' actions affect the sawmills' profitability. To facilitate superior customer value creation, collaboration throughout the sawn timber value chain is needed. To optimize these chains, information sharing is key. Access to the information necessitates confidential relationships (Handfield & Bechtel, 2002). The information by itself is not useful, but the firm must have the capability to manage this information to turn it into knowledge and then into action (Day, 2000). Digitalization binds these endeavors by enabling the analysis of vast amounts of data and interlinking actors throughout the value chain. Instead of studying merely sawmills, this thesis takes a stance to the entire wood products industry, suggesting that customer orientation should be an organizational strategic approach throughout the value chain. Next, the theoretical contribution and managerial implications of the results are discussed, followed by limitations and suggestions for further research.

### **5.1. Theoretical implications**

This thesis has following theoretical implications. *The study contributes to better understanding about the wood products industry's current strategic orientation.* Previous research suggests that market or customer orientation prevails within the industry (Cohen et al., 2001; Hansen et al., 2005, 2011). However, many scholars have pointed out that the forest industry is still strongly production-oriented (e.g., Brege et al., 2010; Stendahl et al., 2013; Toppinen et al., 2013; Han & Hansen, 2017; Pelli et al., 2017). This thesis supports the latter view. The findings indicate that sawmills understand customer orientation as satisfying



customers' needs with an offering. Individual services seem add-ons to the core material offering, emphasizing a production-oriented strategy, not customer orientation. In an increasingly complex business environment, it is essential to understand that customer orientation and customer value creation covers many other aspects than traditional offering (i.e., meeting quality demands, delivery times and product customization). Moreover, the results suggested minor efforts to place customers at the core of the sawmills' business. This refers to measures that aim at continuously providing superior customer value, such as genuine interest in learning from the customers or a willingness to invest in customer relationships. While the core offering will remain important for the sawmill industry in the future, the business focus should be targeted toward genuine interest to solve the customer's problems and, most importantly, a collaborative attitude throughout the value chain. Compared to earlier research (e.g., Toppinen et al., 2011; Mattila et al., 2016), this study's findings are congruent and supplementary. In other words, comprehensive understanding of the overall picture and systematic ways to facilitate customer value creation are needed.

*The thesis develops better understanding about the benefits of applying value-based business strategy and SL in the traditional wood products industry.* Typically, RBV has been used in forestry business research as the conceptual framework. This view emphasizes a firm's role in the value creation process, where the firm determines its market structure, competition and performance by combining resources and competences in different ways (Mele & Della Core, 2013). Hence, external factors do not affect to the firm's success. To better understand value creation in relationships (i.e., provider-customer interaction) and a customer's role as a value creator, service-based business approaches should be applied. One of the benefits of this approach relates to improved interaction, not only between a provider and a customer, but also between the provider and its suppliers. As suggested by Payne et al. (2008), improved interaction throughout the supply chain is needed to uncover customers' latent and future needs. As the surrounding forest resources are a given, improved collaboration among sawmills, wood supply, further processors and other customers is vital. The results are also in line with the findings of Nurminen et al. (2009), who argued that new tools and collaboration are needed to better match the needs of the sawmills' customers with forest resources. Although the industry realizes that new approaches to value creation are needed to maintain and gain competitive advantage, existing attitudes and traditions seem to hinder the transformation. The novelty of applying SL in the forestry context is that customers are a premise for the entire business instead of being viewed as objects in a transaction. Compared to the prevailing, production-oriented business logic in the wood products industry, SL offers better premises for customer value creation and a firm's long-term competitiveness (Woodruff, 1997).

*This thesis enhances understanding of the benefits of digitalization within the forest industry.* In today's business world, profitability is primarily affected by a firm's ability to generate new knowledge through constant learning (Tseng, 2016) and to exploit knowledge to create superior customer value (Woodruff, 1997). Digitalization is at the core of these endeavors. With this perspective in the wood products industry context, the results suggest that digitalization is at the core of innovation in all three forms: product, process and business system innovation. By interlinking actors throughout the value chain and by enabling the analysis of vast amounts of data, a firm can adjust processes, products and services to develop new offerings and innovations (Gassmann & Zeschky, 2008). Because the needed skills and knowledge are seldom found inside a single firm's boundaries (Möller & Svahn, 2006), to benefit from digitalization, improved collaboration with other value chain partners is emphasized. This idea supports the earlier discussion that links strategic collaboration and a

firm's long-term competitiveness in the wood value chains (e.g., Mattila et al., 2016; Toppinen et al., 2011). Since trust among value chain partners is critical to foster collaboration (Handfield & Bechtel, 2002), changes throughout the entire organization's mind-set may be required. This requirement is consistent with Chesbrough (2010), who noted that to capture the highest possible value from technology-related innovations, the innovation process should not be restricted only to products, but rather it should affect the organization as a whole.

Although suppliers have been recognized as decisive sources for innovation, earlier literature largely neglects the supplier's viewpoint regarding the factors that motivate them to share their best knowledge with the buying company (Johnsen, 2009; Smals & Smits, 2012). *This thesis empirically identified ways to increase suppliers' willingness to support the buyer's innovation process.* As the results indicate, incentives for sharing knowledge can vary from monetary to non-monetary factors. Customer attractiveness (i.e., value from the relationship and access to knowledge) was found to be one of the key factors stimulating suppliers to share their knowledge. It is not surprising that information sharing was also highlighted in the results, as knowledge is an enabler of innovation (Chesbrough, 2003). However, remarkably, the suppliers were willing to compromise trust, which is regarded as the most important success factor for open innovation (e.g., Adler & Kwon, 2002; Handfield & Bechtel, 2002; van Echtelt et al., 2008; Paasi et al., 2010), if there was a possibility to improve their own organizational capabilities (e.g., build a knowledge-base, improve quality). This result may reflect a transformation toward a knowledge-based economy, centering on intellectual capital. Conversely, the result could be affected by a long-term economic downturn, so many firms' top priority may be to gain a market share.

Finally, *this thesis clarifies how digitalization can improve service-based business.* The literature regarding digitalization lacks a strategic approach in research (Montague et al., 2016; Nilsson et al., 2017). Service-based business logic, along with the emphasis for increased interaction, open new and intriguing avenues for research. According to SL, a firm only facilitates customer value creation by integrating monetary or non-monetary resources (e.g., knowledge, skills, raw materials, technology) into an offering (Grönroos, 2011; Grönroos & Ravald, 2011; Lindic & da Silva, 2011). However, if a firm's and a customer's processes are integrated as an interactive process, the firm becomes a co-creator of value (Grönroos et al., 2013). In addition to digitalization enabling streamlining processes and access to the vast amounts of data, it can be used for high degrees of interaction with value chain actors. For firms, this can mean at least two benefits. First, by increasing human-computer interaction, firms can gain opportunities for innovation (Nylen et al., 2015). Second, firms can become co-creators of value by engaging customers via digital processes. According to the results, "virtual forest tours" or a real-time integration of customers into the manufacturer's production process could be the first steps toward the value co-creation.

## 5.2. Managerial implications

For managers, this thesis provides four important implications. *The managers should reflect on their business in relation to current and future customer needs.* Mature and commodity-focused industries, such as the sawmill industry, typically seek profitability through production efficiency (Lähtinen et al., 2008). The changes in society and increasingly diversifying customer needs drives firms to seek competitiveness beyond improved product characteristics and product price (Vandenbosch & Dawar, 2002). Empirical evidence

increasingly demonstrates the importance of customer orientation to a firm's performance (e.g. Brady et al., 2001; Saura et al., 2005; Teece, 2010; Blocker, 2011; Hansen et al., 2015). The results imply that this importance is acknowledged by many sawmill managers as well. The customers' expectations of suppliers increase along the sawn timber value chain, and it is likely that this acts as an incentive to place customers at the core of the sawmills' business strategies. As customer-oriented business strategies can be implemented in many ways (Korhonen, 2016), it is important for firms to identify and activate those resources that provide advantages over peers. This study suggests that product-related value attributes, such as reliability of delivery and consistent quality, are important for the sawmills' customers. However, improvements only focusing on these aspects represent product-oriented strategy. The needs of the sawmills' customers are more manifold than sawmills assume, extending beyond product characteristics and process efficiency to intangible resources, such as supplier's expertise and knowledge, sales and service attitude, real-time integration with the customers' processes and willingness to collaborate. All these are factors have been thus far underutilized both by the sawmill industry and by the entire wood products industry, which supports the earlier views stating that customer demands have become more diversified and complex (e.g., Gustafsson, 2006; Han & Hansen, 2016). As customers and suppliers seem to show genuine interest, and need, in integrating with a provider, the starting point for developing service-based business is promising.

*The managers need to understand the essence of customer orientation as a strategic approach to a firm's competitive advantage.* This statement refers to a customer's role as a value creator. As mentioned in the theoretical implications, the sawmill industry is not customer-oriented, contrary to many sawmill managers' perceptions. The industry lacks measures to understand customers' needs and to continuously provide superior value to the customers (Narver et al., 1990). The other value chain actors view the industry as traditional and reluctant to change. The results imply that sawmills perceive individual services (material and immaterial) as customer orientation; however, this view indicates servitization (Oliva et al., 2003; Neely, 2008; Wilkinson et al., 2009) and production-oriented strategy, (i.e., goods-dominant logic [GDL]). In GDL, a firm's role is to provide an offering that best fits the customer's processes, and afterward, it is a customer's responsibility to make effective use of this given resource (Grönroos, 2011a). Customer-oriented business approaches take a different view, emphasizing customers' role as value creators. Customer-oriented firms take a broader, supportive role in the customers' value creation process (Grönroos, 2008) by integrating and sharing their resources throughout business relationships (Grönroos, 2007). Thus, firms should start implementing customer-oriented business by learning from the customers and responding with goods and services that consistently offer customers superior value and greater satisfaction (Brady et al., 2001). It should be noted that a firm's practices and persons executing an interaction highly affects value creation (Guenzi et al., 2007). Furthermore, the customer's actions affect the benefit a firm gains. For example, the customer's lack of practical knowledge can "spoil" a good product or service.

*To gain the full potential of customer-oriented business, collaboration with other value chain actors is needed.* One of the main benefits relates to improved opportunities for innovation. Acknowledging the large innovation potential of external actors (Klioutch et al., 2011; Schiele et al., 2011; Lager et al., 2015; Pulles et al., 2015), firms using external resources in business have better conditions to cope with intense competition and to achieve SCA. Through interactions with customers, suppliers or other stakeholders, firms can gain access to both explicit and tacit knowledge. This access is valuable, as knowledge can be used to improve the firms' organizational knowledge-base and skills that are difficult or

costly for peers to imitate. In addition, improved collaboration impacts to entire wood value chain's profitability through better prerequisites to contribute to customer value creation. This was especially evident in wood supply. The results indicate that wood suppliers' motivation to improve quality and to exceed customers' expectations was lower because they believed the sawmills' were unable to benefit from their efforts (i.e., improved wood raw material quality). The wood supply has a notable impact on the whole value chain's profitability because a wood supplier's ability to fulfill a sawmill's requirements regarding timber quality, dimensions, length and delivery times is decisive. The lack of collaborative attitude between the value chain actors can result in significant loss of value creating potential. As the results demonstrate, the main challenge undermining the increased collaboration in wood value chains seems to relate to organizational attitudes and traditions. Therefore, the managers should understand the growth potential business through collaboration. Furthermore, the managers need to recognize possible associated problems, such as a loss of control (Alter & Hage, 1993) or high knowledge search costs (Laursen & Salter, 2006), that may arise through collaboration. The key factor for successful collaboration is trust among the actors (Handfield & Bechtel, 2002). Also, the managers need to pay attention to appropriate organizational structures and managerial practices (Colombo et al., 2011) affecting all levels of a firm (Gianiodis et al., 2010).

*The managers need to understand that digitalization can be a disruptive force and it can offer significant options to gain competitive advantage.* Digitalization provides massive business opportunities in streamlining operations, developing products and services that stand out from rivals and creating new business practices. By increasing interaction with customers and other stakeholders, digitalization is a powerful tool in improving customer experience and in differentiating a firm from its rivals in a way that contributes the SCA. The results of this study indicate that the managers should look at the possibilities of digitalization in business more broadly than they currently do. While the majority of the development ideas related to methods to apply digitalization, namely operational efficiency (i.e., reducing costs), this is only one, narrow area where digitalization can be useful. The wood products industry has plenty of untapped potential to satisfy increasingly versatile customer needs through digitalization. This potential relates to new ways to develop businesses and completely transform business roles. The advantages enabled by digitalization, such as gaining access to a wide range of knowledge sources, learning from customers, building networks, gaining access to wide markets and velocity, should not be ignored by any firm within the wood products industry. Furthermore, the firm's capability to implement digital transformation should not be ignored. A key to success is organizational capabilities (Bharadwaj et al., 2013), such as organizational learning (Tippins et al., 2003), leadership style (Seah et al., 2010; Verdú-Jover et al., 2014) and adaptive organizational culture (Alos-Simo et al., 2017). However, as Laursen et al. (2006) states, the cost of obtaining knowledge should not be too high. Moreover, technology should always be regarded as a tool used by a human being.

*The transition from product-oriented business toward customer orientation should start with the organization's attitudes.* Changes in the business environment (e.g., globalization, changing customer needs) have eroded the sources of competitiveness in traditional businesses that often rely on cost minimization. To improve competitiveness, researchers have suggested that manufacturers in developed economies should compete on the basis of value delivered instead of on the basis of cost (Porter & Ketels, 2003). More precisely, the value should be created in relationships (i.e., the customer-oriented view), not delivered by an offering (i.e., the traditional, manufacturing view). The sawmill industry is affected by numerous factors (e.g., environmental and social sustainability, demands for raw wood

availability, logistics, lead times, uneven quality of the wood raw material) that impacts the customer relationships and business development within the industry (e.g., Carlsson & Rönnqvist, 1999; Arce et al. 2002; Panwar & Hansen 2009, Toivonen, 2011, Toppinen et al., 2013). Rather than viewing them as limiting factors, the industry should view these issues as opportunities for exploiting new technologies (e.g., digitalization) to improve interaction and co-learning within the wood supply chains. This shift in view would create greater efficiency. The first step in change toward a customer-oriented business (i.e., service-based business) is to embrace customer orientation as an organization-wide attitude: organizational values, norms, artifacts (e.g., stories, rituals) and behaviors (Homburg et al., 2000), including a firm's attitude toward new technologies and its ability to exploit them (Matt et al. 2015). By fostering an open attitude toward customer-focus, a firm can improve its relevance for its customers through relationship closeness (Primo & Amundson 2002), more efficient information transfer (Rosell, 2014; Nitzsche et al., 2016) and the ability to address customers' changing and emerging demands (Lenka et al., 2017).

### **5.3. Reliability and validity of results**

Research designs are commonly judged according to following criteria: (1) reliability (i.e., repeatability of findings), (2) construct validity (i.e., valid measures selected to assess the phenomenon), (3) internal validity (i.e., detecting causal relationships with appropriate measures) and (4) external validity (i.e., generalizability of the results) (e.g., Yin, 2014). This thesis is based on descriptive or exploratory studies; thus, the focus is reliability, construct validity and external validity. Internal validity is not discussed because it is important only for explanatory (causal) research designs (Yin, 2014).

Research reliability can be improved by careful documentation throughout the research process (Eisenhardt et al., 2007). Yin (2014) proposes involving several researchers to evaluate the findings. This study's documentation relates to the chosen research methods, data collection and analysis described in Chapter 3 and, in more detail, in the individual articles. A case study database was created and maintained for all three dyads. In most of the interviews, two researchers were present taking their own notes. As the interviewees' knowledge about the phenomenon grew during the interviews, the aim was to decrease possible bias by relying strongly on the theory, as suggested by Easton (1995). Each interview session was recorded and transcribed to decrease respondent error (i.e., different interpretations of questions), observer error (i.e., different ways to conduct the research) and bias (i.e., failure to provide accurate answer) (Kathleen M. Eisenhardt et al., 2007). Those interviews with only one interviewer present, were more vulnerable to the error and bias. To overcome this, the field notes and transcripts in the data analysis phase were analyzed by two researchers. Further, to improve reliability, the steps of qualitative data analysis suggested by Miles and Huberman (1994) (data reduction, data display, and drawing and verifying conclusions) were performed.

Construct validity is highly affected by a researcher's ability to objectively see the phenomena. This validity can be strengthened by using multiple evidence sources and asking external people to review the reports (Yin, 2014). In this thesis, various informants and data collection methods (recordings, notes, company documents and interviews) were used. Obtaining the interviewees' viewpoints followed the suggestions of Kreuter (2008): to prevent giving signals of approval or disapproval during the interview and to avoid affecting the interviewee's responses by any means. The researchers verified their views by comparing

their individual notes when checking the data. As advised by Yin (2014), the initial findings were reviewed with the case company during the analysis phase to detect unclear issues (in Article I). Also, the results were reported to the interviewees and an option for feedback was given. However, the results were kept in their original form, following the suggestion of Miles and Huberman (1994).

External validity, also called generalizability, refers to a process that uses particular data to draw conclusions that can be applied to other people, settings or time (Ferguson, 2004). Maxwell (1992) remarks that explicit claims about generalizability are seldom presented by qualitative researchers. However, this does not diminish an importance of qualitative research. The sample representativeness is critical for external validity (Morgan & Harmon, 1999), which is gained through data saturation. Statistically assessing the sample's interviewees was not feasible; thus, the purposive sampling technique was used. One of the main criteria was to interview people who were expected to be the most knowledgeable in their field. In Article I, three embedded cases were involved, instead of single case study, to improve external validity. The results were compared to the extant literature, during the data analysis, to differentiate the case-specific findings from the generalizable findings (Yin 2014). In Articles II and III, the sample varied in respect to interviewee positions and specialties. This variation was intended to ensure that all key categories relevant to the subject matter were covered and that each category was as diverse as possible (Ritchie et al., 2003). In Article I, data saturation was not achieved because it was not possible to examine additional cases due to the project budget and time restrictions. Articles II and III indicated data saturation despite a rather small number of interviews.

As Maxwell (1992) stated, it is impossible to observe everything in qualitative research. Therefore, it is crucial to understand what was not observed because of sampling or the observer. Generally, one of the greatest limitations of this study relates to its generalizability. In Article I, the buyer company represents only one sector, which is quite exceptional and infrastructure-oriented. Even if the results provide a body of knowledge on supplier innovation in complex environments, cross-sectoral studies should be conducted to assess the generalizability of the results. In Articles II and III, sawmilling is a heterogeneous branch of business, and hence, the results cannot be generalized to the industry level. Also, the number of interviews in each studied group (sawmills, further processing, industrial end-customers) was rather small. The sample size was particularly small in wood supply, and the sample only represented large firms. This problem was slightly relieved by the fact that views on wood supply were also gained in the sawmill interviews. To diminish the potential bias resulting from this, snowball sampling was used. Nevertheless, by design, these studies' findings are not statistically generalizable (Kvale, 2007). They should be regarded as indicative, providing useful proposals for further studies and references for strategic planning for the actors in the sawn timber value chain.

#### **5.4. Suggestions for further research**

The findings of this thesis provide important preliminary observations and suggestions on customer orientation, digitalization and innovation in the wood products industry. In further studies, these findings should be tested with larger samples and in broader contexts. Interviews with professionals operating in pioneering industries, such as the technology industry (e.g., Amazon and Google) or automotive industry, could be one promising option to more profoundly evaluate the potential.

As the research by Håkansson and Snehota (1989) suggests, all stakeholders affect firm competitiveness and thereby should be considered in strategic decisions. This is especially important because many manufacturing firms operate as part of long and complex value chains (Niemi et al., 1996), and firms no longer have all the diverse components of knowledge within their own organizations to be competitive in research, production and marketing (Bilbao-Osorio & Rodriguez-Pose, 2004). To facilitate higher customer value creation and to maximize overall profitability, firms should pursue a high degree of collaboration and improve relationship closeness with customers and other stakeholders (Primo & Amundson 2002). This thesis takes a first step in empirically studying the needs of sawmill customers. In the future studies, a more profound understanding of customers' needs and other stakeholders' views about how to satisfy these needs in collaboration with the wood value chain actors would be beneficial. Better understanding of customers' perspectives is vital because, as the results suggest, the providers' perceptions of customers' needs may not always correspond with reality. Consequently, firms may lose opportunities for innovation and greater customer satisfaction. Likewise, a better understanding of motivating factors (e.g., financial benefits), as well as possible associated problems (e.g., a loss of control, quality, financial and competitive position) (Alter & Hage, 1993), should be achieved to encourage discussion between the managers within the wood value chains and to provide support for decision making.

Further research should better understand the barriers hindering the adaptation of customer orientation. One of the major challenges seems to relate to sawmills' unwillingness to change prevailing traditional business strategies. Sawmills perceive themselves as relatively customer-oriented, but the customers' perception is completely the opposite. Customer orientation is, largely, about an organization-wide attitude (Grönroos & Gummerus, 2014), placing customers at the core of the business. Often, this means fundamentally new ways of doing business. The investments in the sawmill industry are large and the wood supply chains are long and complex. This may restrain willingness to change existing structures and practices. However, societal changes, such as sustainability, changing customer needs and emerging new technologies, do not ignore any industry. Therefore, better understanding about the reasons behind a strong desire to preserve the old operating models is important.

Also, methods to utilize digitalization for developing customer-oriented business requires more attention. Digitalization affects all industries, driven by customers' demands. The key requirements for successful digital transformation vary from organizational innovative attitudes and measures to financial aspects (Matt et al. 2015, Legner et al. 2017). The aim is to improve customer focus (Matt et al., 2015); thus, the topic should be at the core of business studies. To understand various aspects of the business potential of digitalization, future research should take an interdisciplinary approach, integrating several research areas, such as computer science, marketing and strategy, innovation, and behavioral sciences. Since the wood products industry has many ideas about improving firms' internal efficiency (processes), more attention should be given to new offerings (products and services) and to ways of doing business (e.g., business roles and ways of communication). A core issue is the application of the knowledge-based economy in the wood products industry. Subsequently, the other approaches emphasizing knowledge as a key resource to achieve organizational objectives, such as knowledge management, would provide interesting avenues for future research.

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